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HRF Flight Rack One Integration Test Procedure V: Rack Activation/Deactivation

LS-71139-5B

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**HRF Flight Rack One
Integration Test Procedure V:
Rack Activation/Deactivation**

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ABSTRACT

This document provides the Rack Activation/Deactivation procedures for the Human Research Facility (HRF) Rack. The procedures describe the activation and deactivation of the HRF Rack and payload drawers.

The primary purpose of HRF Rack Activation/Deactivation is to perform the sequences necessary to Activate/Deactivate the HRF Rack and each payload drawer in the HRF Rack. The Rack Activation/Deactivation procedure will be conducted in the Building 241 Payload Rack Check-out Unit (PRCU) test environment at the Johnson Space Center, Houston, Texas. A step-by-step sequence of activities to be conducted is included in Section 6.0 of this procedure.

A Test Readiness Review (TRR) will be held prior to the start of any test activity. The TRR Board, Quality Engineering, and the Payload Test Conductor will agree to proceed with the individual tests listed in this document.

KEY WORDS

Human Research Facility
International Space Station Program

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LIST OF ACRONYMS AND ABBREVIATIONS

APID	Application Process Interface Identifier
Assy	Assembly
AUX	Auxiliary
BIT	Built in Test
CAM	
CCSDS	Consultative Committee for Space Data Systems
C&DH	Command & Data Handling
Ch	Channel
Comm	Communications
CONFIG, CFG	Configuration
CORE	Common Operational Research Equipment
NFIG, CFG	Configuration
COTS	Commercial Off the Shelf
DC	Direct Current
DR	Discrepancy Report
Dwr	Drawer
EDAC	Error Detection and Correction
EMU	EXPRESS Memory Unit
Enet, Eth	Ethernet
Err	Error
EXPRESS	EXpedite the PROcessing of Experiments to Space Station
EXP	EXPRESS
FDS	Flight Data System
FOD	Foreign Object Damage
FPDP	Front Panel Deployed Payload
GASMAP	Gas Analyzer System for Metabolic Analysis of Physiology
GSE	Ground Support Equipment
HB	Heartbeat
HPM	
HRF	Human Research Facility
HRL	High Rate Link
HRLC	High Rate Link Card
HRO	
ID	Identifier
IFPR	Integrated Flight Prototype Rack

LIST OF ACRONYMS AND ABBREVIATIONS (CONT'D)

ISPR	International Standard Payload Rack
ISS	International Space Station
ITCS	Internal Thermal Control System
JSC	Johnson Space Center
LAN	Local Area Network
LAP	Laptop
LED	Light Emitting Diode
LOV	
Mb/S	Mega-bits per Second
MDM	Multiplexer/Demultiplexer Module
Med	Medium
MEIT	Multiple Element Integrated Test
MOD	Moderate
MRL	Medium Rate Link
MRT	Medium Rate Telemetry
NASA	National Aeronautics and Space Administration
PASS	Primary Avionics Software System
PEHB	Payload Ethernet Hub Bridge
PEHG	Payload Ethernet Hub Gateway
PEP	Payload Executive Processor
PEPSE	Programmable Electrical Power System Emulator
PLD	Payload
PL/MDM	Payload Multiplexer/Demultiplexer Module
POST	
PRCU	Payload Rack Check-out Unit
Pwr	Power
QA	Quality Assurance
Qty	Quantity
Rcv	Receive
RFC	Recirculating Flow Control
RIC	Rack Interface Controller
SIR	Standard Interface Rack
SSPCM	Solid State Power Controller Module
STBY	Standby
Succ	
Stwg	Stowage

LIST OF ACRONYMS AND ABBREVIATIONS (CONT'D)

SV	Shuttle Vehicle
Sw	Software
TBD	To Be Determined
TLM	Telemetry
TPS	Task Performance Sheet
TV	Television
V	Volt
VRDS	Verification Requirements Data Sheet
Xfer	Transfer
Xmt	Transmit
wrkstn	Workstation

1.0 INTRODUCTION

1.1 PURPOSE

This document provides the necessary procedures to activate, configure, and deactivate the HRF Rack and all necessary payloads during verification testing. The expected end product of this activity is the successful activation, operation, and deactivation of the HRF Rack and its components. This document does not address any Human Research Facility (HRF) Rack to PRCU instructions other than the initial power activation, remote commanding and deactivation.

1.2 SCOPE

This document provides task sequencing to satisfy the test requirements as detailed in the document "Rack One HRF Unique Payload Verification Plan" in SSP-57400, "Human Research Facility Unique Payload Verification Plan for Rack 1, International Space Station Program." The details listed herein describe the necessary hardware, configuration, test equipment set-ups, instrumentation requirements, data requirements, safety concerns, and all other details necessary to perform the appropriate procedure.

This procedure applies to the subsystems and components of the HRF Rack and the PRCU test environment. It encompasses the initial power, configuration and activation of payloads. HRF Rack software systems operations are performed by Lockheed Martin HRF personnel and other agencies are described herein.

1.3 DOCUMENT OVERVIEW

This document details the test setup, tear down, and test procedures. The procedure is divided into seven (7) Sections:

Section 6.1	RACK ACTIVATION
Section 6.2	RACK CONFIGURATION
Section 6.3	PAYLOAD ACTIVATION
Section 6.4	PAYLOAD DEACTIVATION
Section 6.5	RACK DECONFIGURATION
Section 6.6	RACK DEACTIVATION
Section 6.7	EMERGENCY POWER DOWN

1.3.1 Document Hand-Write Change Control

This document is designed to present baseline procedures for HRF Rack activation and deactivation. It is therefore assumed that this document is subject to hand-write changes while in use in the test area. Hand-write

entries will be controlled and documented in this procedure. All hand-writes must be approved by Quality Engineering and the Test Conductor prior to implementation. Quality Assurance will validate all hand-writes. If safety is affected, then Safety Personnel must also approve changes. The personnel that have Task Performance Sheet (TPS) signature authority are authorized to make hand-write changes to this document. Hand-written changes to this document will be done using deviation sheets (See Appendix A). This document will be revised to include permanent hand-written changes.

1.3.2 Warnings and Cautions

Prior to performing any operation, test personnel must be familiar with all "General Notes, Warnings, Cautions, Special Instructions and Safety Precautions" contained in the reference documents and drawings unless otherwise specified within this procedure.

1.3.3 Task Sequencing

The procedures outlined in this document are written to ensure technical completion of a specified task and are not necessarily sequenced to provide optimum crew/tool equipment utilization or HRF Rack build-up. The work is to be accomplished sequentially, unless it is more efficient to parallel the operations. The responsible Test Conductor must first evaluate any change to assure that there is no degradation of technical requirements, system safety, personnel safety, scheduling, etc. Sequencing changes require concurrence from Quality Assurance.

1.3.4 Repeat Operations

Prior to proceeding, operations that must be repeated require approval of the Test Conductor, and Quality Assurance. All repetitive operations must be documented in the Repetitive Operations Log in Appendix A.

1.3.5 Discrepancies

If any discrepancy occurs in the form of an equipment failure, hazard, or emergency, the personnel concerned will take appropriate action to ensure personnel and equipment safety, and report to a Quality Assurance Specialist. The Test Conductor will notify the National Aeronautics and Space Administration (NASA) facility manager and act as focal point for any further effort required. If required, a Discrepancy Report (DR), Johnson Space Center (JSC) Form 2176 will be initiated by Quality Assurance, and will be tracked and worked as described in document NT1-ADM-013 (See Appendix A).

1.3.6 Safety Support

JSC Safety & Health Requirements established in document JPG 1700.1 Version H, will be strictly adhered to throughout all phases of test activities. All hazardous activities will be coordinated with the appropriate facility personnel.

1.3.7 Emergency/Accident Procedure

The following procedures are to be used in the event of an emergency situation, (i.e., smoke or fire) or in the case of an accident involving personal injury.

Emergency procedures provide pre-planned and approved guidelines for handling potential hardware/software malfunctions and hazardous situations. If a hazardous situation occurs, the following definitions state the actions necessary to maintain control of the situation and personnel safety. Actions required for the situations not covered by these procedures shall be provided by the Test Conductor real-time, based on his/her best judgment.

Definitions

Abort Test: Take immediate and rapid actions for restoration of safe conditions removal or rescue of test personnel, notification of the appropriate personnel about the hazardous situation, and shutdown of all systems. This action is taken in catastrophic critical hazard conditions such as fire, smoke, or serious personnel injuries.

Terminate Test: Discontinue test per the standard shutdown procedures provided. This action is required when the situation prevents further compliance with the test objectives.

Hold and Evaluate: Maintain current test conditions or proceed to safe mode to allow time to review system status and impacts of the situation. This action is required in the event of a hardware/software malfunction.

Emergency Exits and Equipment

Figure 1-1 shows the emergency exits for personnel in the test area, and shows the location of fire pull-stations and fire extinguishers. Figure 1-2 shows the emergency meeting place outside of Building 241.

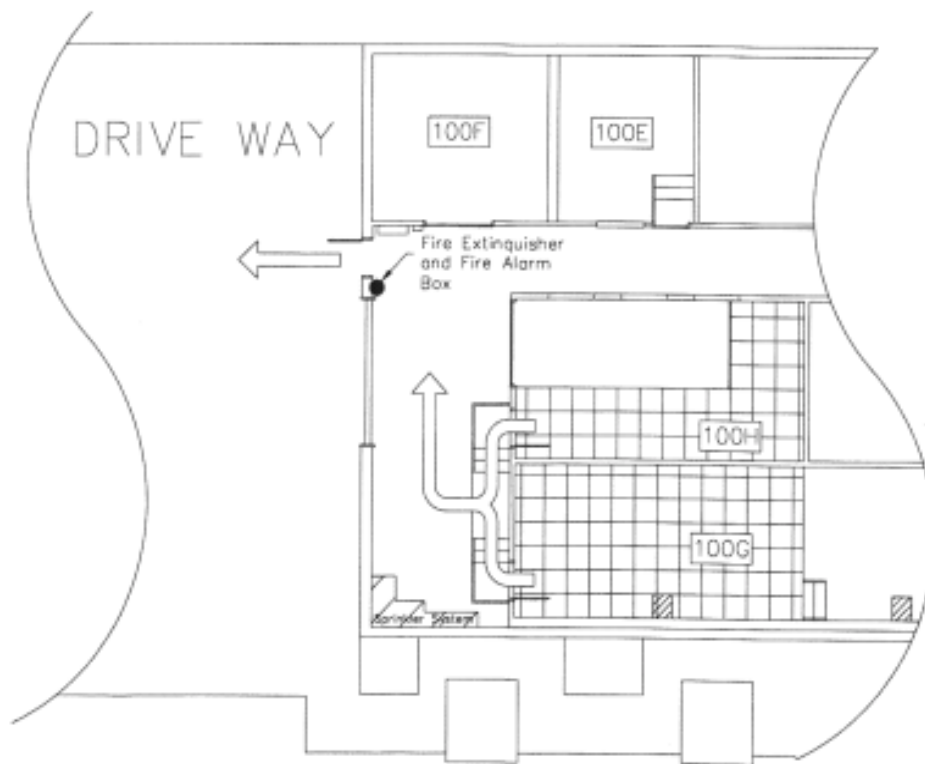


Figure 1-1 241 Facility Clean Room Emergency Exits

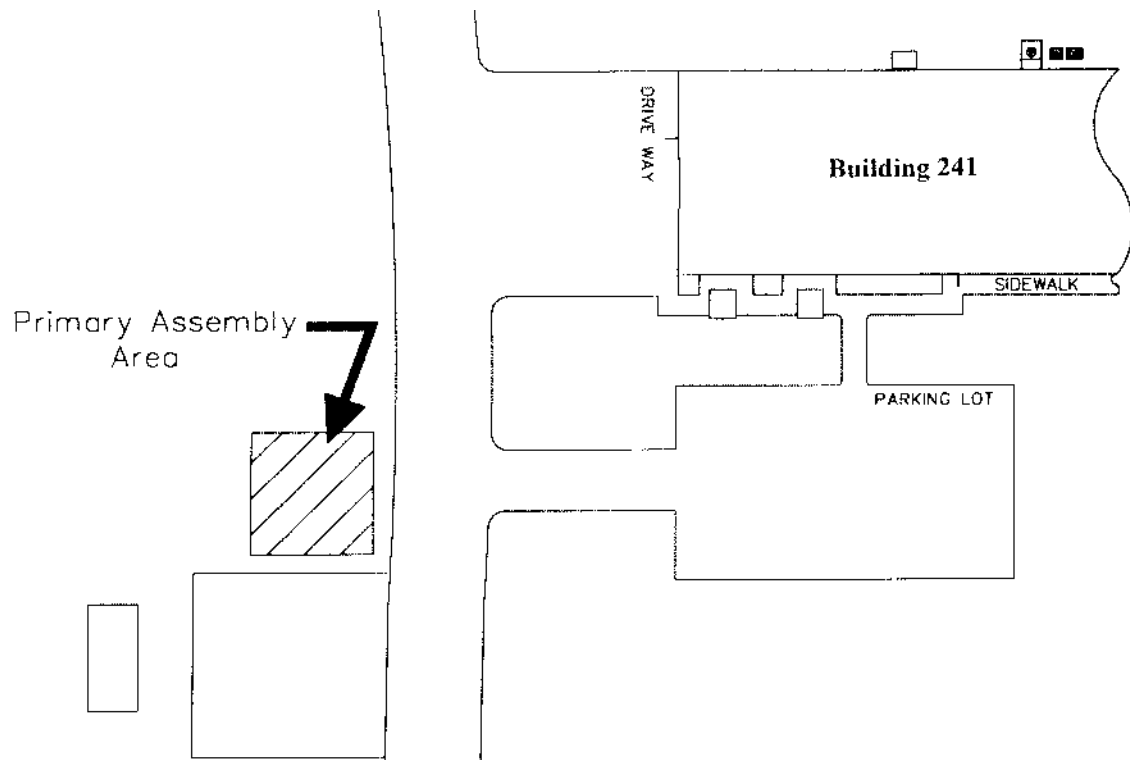


Figure 1-2 241 Facility Emergency Meeting Place

Emergency/Accident Reporting

The Facility Engineer has the primary responsibility of initiating the notification process. General Emergency Instructions:

- (1) Sound the alarm and evacuate the area.
- (2) If safe, render/de-energize energy systems.
- (3) Initiate Flash reporting sequence. (See Appendix A)
- (4) Establish emergency response team to support follow on action.

Figure 1-3 shows the JSC Emergency Number and Reporting Sequence. This number is a coordinated number for the emergency related medical, fire and security groups at JSC.

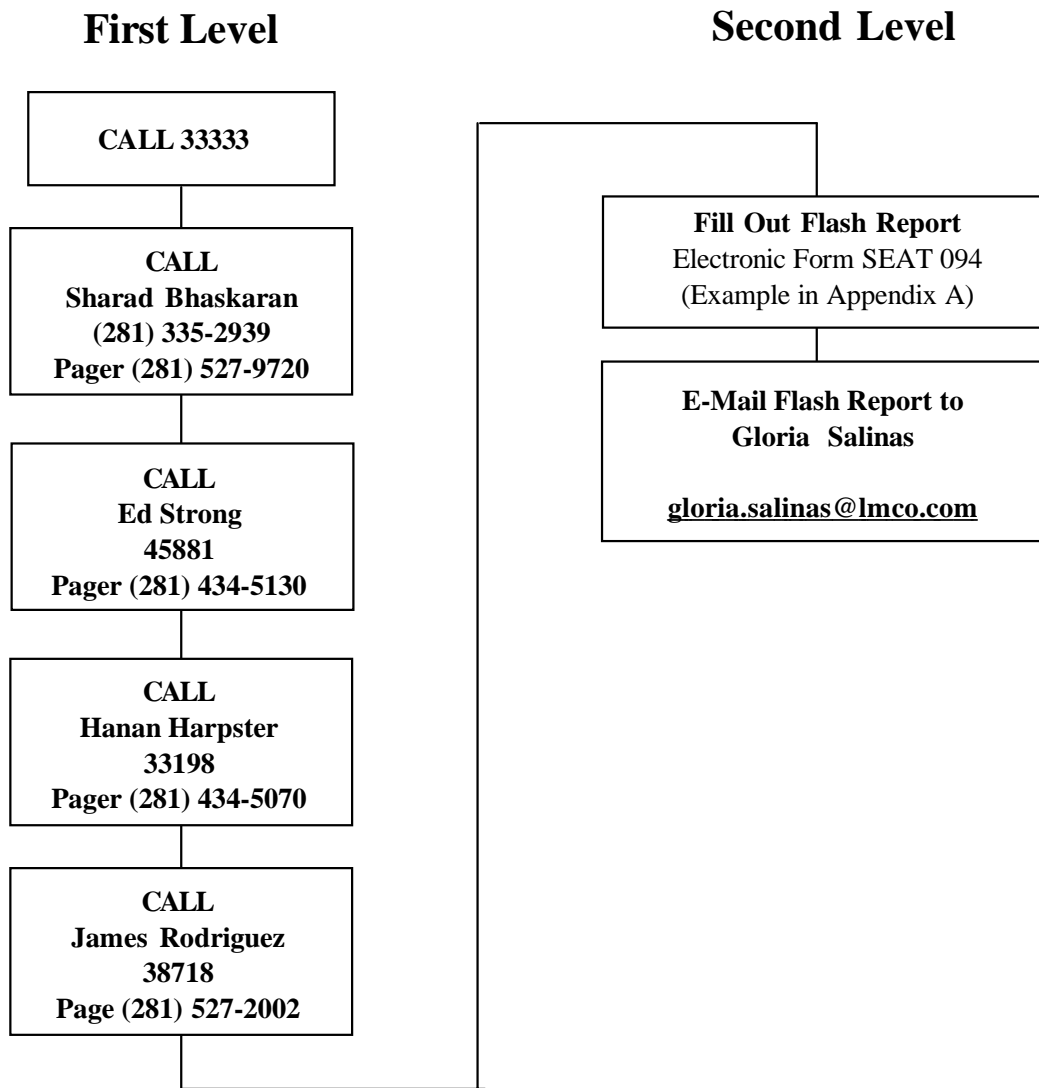


Figure 1-3 JSC Emergency Number and Reporting Sequence

Systems Emergency Procedures

The following procedures are to be carried out by the Test Conductor and Test Personnel in accordance with the condition as defined below:

CONDITION	RESPONSIBILITY	ACTION
Fire/Visible Smoke in Test Area	Test Conductor/ Technician	Abort Test

- (1) Sound the alarm: Activate alarm at pull box and/or phone in emergency.
- (2) Do not move injured personnel unless necessary to prevent further injury.
- (3) If safe, attempt to de-energize system, i.e. thermal, electric, etc.
- (4) Initiate notification process. This may be conducted away from the situation from a telephone.

CONDITION	RESPONSIBILITY	ACTION
Electrical burn/smoke odor	Test Conductor/ Technician	Terminate Test

- (1) Shutdown all electrical test equipment systems.
- (2) Locate nearest fire extinguisher.
- (3) Investigate/Isolate the source of odor.
- (4) If required, perform steps associated with a Fire/Smoke situation.

CONDITION	RESPONSIBILITY	ACTION
Loss of Facility Power	Test Conductor/ Technician	Hold & Evaluate

- (1) Evaluate the situation and impact to the test. Investigate the cause and potential frequency of occurrence. Take appropriate steps to restore the failed systems to their nominal/safe operating conditions.

Personnel Emergency/Accident Procedures

CONDITION	RESPONSIBILITY	ACTION
Serious Personal Injury	Test Conductor/ Technician	Terminate Test

- (1) To prevent further injury, do not move the injured personnel unless necessary.
- (2) Render the area safe, then administer first aid as required.
- (3) Initiate notification process.
- (4) Do not leave injured personnel alone until emergency personnel arrive.

CONDITION	RESPONSIBILITY	ACTION
Minor Personal Injury	Test Conductor/ Technician	Hold & Evaluate

- (1) Render the area safe, then administer First Aid as required.
- (2) Initiate notification process.
- (3) Take injured individual to medical treatment facility.

1.3.8 Hazardous Waste Handling

Hazardous material identification, labeling and storage at Building 241 shall be done according to JSC Form 1161, "Disposal Inventory for Miscellaneous Hazardous Wastes." Disposal containers, transportation and disposal will be provided by the designated JSC waste management service. All Internal Thermal Control System (ITCS) waste disposal in Building 241 should be coordinated through the Facility Manager.

2.0 APPLICABLE DOCUMENTATION

The following documents form a part of this Verification Plan to the extent specified. Tasks and activities referenced in pre-test, post-test, and procedural sequences may be performed using the most recent revision of the document stated.

NASA Documents:

Number	Rev.	Title
JHB 5322	C	Contamination Control Requirements Manual
KHB 1700.7	LI	Space Shuttle Payload Group Safety Handbook
LS-71135-3	A	Human Research Facility Integration Flight Prototype Rack Interface Verification Test
LS-71139-2	B	HRF Flight Rack One Integration Test Procedure II: Payload Rack Checkout Unit Mechanical Operations and Fluid Sampling
NT1-ADM-012	Base-line	Task Performance Sheet (TPS) NT/Occupational Safety and Institutional Assurance Division
NT1-ADM-013	A	Quality Assurance Record Center Discrepancy Reporting and Tracking Systems
SSP57400		Human Research Facility Unique Payload Verification Plan for Rack 1, International Space Program

Boeing Documents:

Number	Rev.	Title
D683-44094-2	A	Human Research Facility Flight Rack Command & Data Handling (C&DH) Acceptance Test Procedure
D683-27519-1	G	User Guide for the Payload Rack Checkout Unit (PRCU)

2.1 APPLICABLE SOFTWARE

The following software provides the configuration data used in this test setup:

HRF Rack Software Configurations are based upon:

Software Item	Version
Rack Interface Controller (RIC)	Expedite the Processing of Experiments to Space Station (EXPRESS) -9
EXPRESS Laptop	EXPRESS HH

PRCU Software Configurations are based upon:

Software Item	Version
Payload Rack Check-out Unit (PRCU)	PRCU Block 2.0
Payload Executive Processor (PEP)	PEP Version 18

HRF Software Configurations are based upon:

Software Item	Version
Common Software	Block 2.3
Commercial Off the Shelf (COTS) Applications	Windows NT/95
Instrument Applications	N/A
Experiment Applications	N/A
HRF Workstation Software	Load 5.0
Integrated Build	Load 5.0

3.0 TESTING PROCESS OVERVIEW

3.1 TESTING OBJECTIVE

The test objectives are as follows:

- Activation and deactivation of the HRF Rack
- Activation and deactivation of payloads necessary for testing
- Configuration and deconfiguration of the HRF Rack using the EXPRESS laptop
- Configuration and deconfiguration of the HRF Rack using the PRCU test environment

3.2 TEST REQUIREMENTS

The following paragraphs describe the requirements of the specific tests to be conducted and may include references to the specific Verification Requirements Data Sheet (VRDS) to be completed.

3.3 TEST CONDITIONS

3.3.1 Test Conduct Ground Rules

The rules as defined in the following subparagraphs will be followed during all test activities.

3.3.2 Roles and Responsibilities

The Test Conductor is responsible for the overall management and integration of all verification testing at the systems level. The Test Conductor is responsible for the safe, successful control and conduct of all testing. The Test Conductor will assure all test team members are knowledgeable of the subsystems required for the verification test to be performed. The conductor acquires and assigns test resources and is responsible for the adequacy of test documentation. Additional responsibilities are:

- Test schedule coordination
- Test resource management
- Assurance of efficient test conduct
- Data and reports coordination

The Test Engineer is responsible for conducting the specific verification testing, including the coordination of test materials and personnel. The Test Engineer provides the test configuration, test plan and required paperwork/procedures. The Test Engineer is the principal technical focal

point for a given test. The Test Engineer coordinates all test data processing and supports the Test Conductor in the preparation of the post test report.

The Facility Engineer is responsible for ensuring that the required instrumentation is calibrated, installed and conditioned to provide the data necessary to meet the test objectives. The Facility Engineer is responsible for the coordination of certified Test Technician/Test Operator support.

The Test Technician/Test Operator is responsible for selection, setup, operation, maintenance and configuration of the test equipment in accordance with the approved test plan and procedure.

3.3.2.1 Test Area Requirements

Special emphasis is to be given to testing flight articles. The following rules will be incorporated into test documentation and compliance is the responsibility of all test team members. Repeated non-compliance may be grounds for denial of access to the test facility.

3.3.2.2 Test Area Cleanliness

Room 100H in Building 241 is certified as a level 100K clean room. Requirements for working in such an environment are detailed in Contamination Control document, JHB 5322C. All test team members with access to room 100H shall be familiar with these requirements and may undergo pre-access training or certification at the discretion of the Facility Engineer. The following rules shall be maintained at all times while in the test facility:

- Smocks, head and beard covers shall be worn at all times.
- Test Area will be kept clean and orderly at all times.
- All debris created during test preparation, conduct, or tear down will be continuously removed to prevent Foreign Object Damage (FOD) contamination.

3.3.2.3 Test Area Access

Access to all test areas shall be limited during test operations. Only essential personnel shall be admitted. The test area, surrounding test consoles, and test instrumentation shall be controlled to restrain visitors and prevent tampering with the test article or test equipment. Determination of essential personnel will be made by the Test Conductor or Test Engineer, and enforced by the Facility Engineer.

3.3.2.4 Work Area Rules

The following work rules shall be observed for the duration of testing:

- All work stands shall have toe boards sufficient to prevent any item from being accidentally dropped into a test article.
- All work stands shall have the side accessing the test article padded to prevent test article damage in the event the stand comes in contact with the test article.
- Rings and watches must be taped or removed.

3.3.2.5 Temporary Configuration Changes

Temporary changes to the Test Article configuration will be accomplished and documented as described in document NT1-ADM-012 TPS NT/Occupational Safety and Institutional Assurance Division.

4.0 TPS AUTHORIZED PERSONNEL

The TPS Authorization is comprised of two (2) types:

- Type A – A Task Performance Sheet that changes the temporary or permanent configuration of the “Flight” (Class I) or Ground Support Equipment (GSE) test hardware. These documents must be reviewed and agreed upon by the customer before obtaining a NASA Signature. Absolutely no work is to be performed without having the proper paperwork in hand with the appropriate signatures.
- Type B – A Task Performance Sheet that does not change the configuration of the hardware which is being tested. These documents do not require a NASA Signature, and are to be coordinated with the customer and submitted for signature.

All documents must have the signature of the Lockheed Martin engineer authority in charge of verification.

If documents require hardware to be pulled out of bond, the appropriate signature authority for the bond room must be included. This list is for reference purposes only, verify before use. The official list is provided in NASA EA5 memo.

LIST OF AUTHORIZED SIGNATURES

Project ID	Project Name	New Project ID	New Project Name	NASA Technical Monitor	Mission Assigned	Other Authorized Signatures
HPMHPMS1	Integration Hardware Definition & Development/Ground Rack Design and Build	HPMS	High Fidelity Mockup/Ground Development Facility/Launch Integration Facility/Payload Rack Checkout Unit	Ed Strong	HRF	Sharad Bhaskaran Robert Henneke Bob Trittipio Tom Wiggins Elton Witt
HPM1	Ground Facilities Development	Deleted – Content moved to HPMS				
HPM3	Water Cooled Rack Development	HPM3	Flight Prototype Rack Integration/Flight Rack Integration	Ed Strong	HRF	Carlos Aquilar Sharad Bhaskaran Todd Leger Kevin Upham
HPCP	HRF Launch Package 1 Hardware Design	Deleted – Content moved to HPM3				
MEIT	Multiple Element Integration Test (MEIT)	Deleted – Content moved to HPM3				

5.0 TEST SET UP

The test setup and tear down will be governed by TPS JSC Form 1225.

5.1 PRE-TEST ACTIVITY

Verify the HRF Rack is properly mated to the appropriate test environment per SIG38116325 REV A. Configure the test environment for HRF Rack testing and apply power per LS-71139-2 Section 6.0.

5.2 POST-TEST ACTIVITY

Remove power from the HRF Rack and power down the test environment per LS-71139-2 Section 6.0.

6.0 TEST PROCEDURE

The following sections include all test environment, payload and EXPRESS laptop activations and configurations needed to power the HRF Rack.

A minimum of two (2) operators is needed to perform the following instructions. The PRCU operator will perform all actions and commands involving the PRCU Control Workstation located in JSC Building 241 Room 100H. An operator for the HRF Rack is stationed near the HRF Rack to implement all configuration and commanding initiated from the EXPRESS laptop. If the test includes an integrated HRF Rack, a third operator must be provided to execute individual payload functions.

6.1 RACK ACTIVATION

HRF Rack activation begins upon power application to the appropriate PRCU International Standard Payload Rack (ISPR) Interface Panel per LS-71139-2, Section 6.2. The sequences provided in Section 6.1 must be executed regardless of the configuration of the HRF Rack.

Prior or subsequent to HRF Rack activation, a "Startup Notification" must be sent from the PRCU Sun Workstation to the Payload Multiplexer/Demultiplexer Module (PL/MDM) to initiate 1553 Bus polling of the HRF Rack. When the PL/MDM receives this "Startup Notification," bus polling of the HRF Rack can be monitored on the Primary Avionics Software System (PASS-1000). Upon HRF Rack activation, "Quick-Looks" or "Snapshots" of the 1553 Bus traffic can be captured and analyzed to verify that the HRF Rack is communicating nominal "Health and Status" to the test environment. EXPRESS Laptop activation may be performed immediately after power is applied to the HRF Rack.

6.1.1 Startup Notification

To allow the HRF Rack to communicate over the 1553 bus, the PL MDM must receive a "Startup Notification" command to initiate 1553 polling of the payload rack. Once polling has begun, the HRF Rack can then transmit Health and Status responses.

TABLE 6.1 STARTUP NOTIFICATION

Step	PRCU	HRF Rack 1	HRF Rack 2
1.	PRCU wrkstn "C&DH Active Session" window Select: "MDM DATA DEFINITION" button Verify the following is displayed: • "MDM Data Definition"		
2.	PRCU wrkstn "MDM Data Definition" window Select: "MDM SERVICES" button Command Application Process Interface Identifier (APID) set to 0046 Common Operational Research Equipment (CORE)		
3.	PRCU wrkstn "Payload MDM Services" window Select: "RIC" index Select: "START UP NOTIFICATION" button Select: "CLOSE" button NOTE: Other notifications may be necessary, depending upon test configuration.		

T:_____ QA: _____

6.1.2 EXPRESS Laptop Activation

The EXPRESS Laptop is to be activated once power is applied to the HRF Rack. The EXPRESS Laptop monitors internal subsystems such as HRF Rack mode, Ethernet communications, power, thermal, and telemetry.

TABLE 6.2 EXPRESS LAPTOP ACTIVATION

Step	PRCU	HRF Rack 1	HRF Rack 2
1.			Integrated Flight Prototype Rack (IFPR) upper front panel • Laptop "pwr" Switch (sw) - on Verify Light Emitting Diode (LED) is illuminated
2.		PCS PWR Supply • "SW1" Switch (sw) - on Verify LED is on	
3.		EXPRESS (EXP) Laptop left side panel • Main pwr sw - on Verify "Windows NT" application starts	

TABLE 6.2 EXPRESS LAPTOP ACTIVATION (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
4.		<p>EXP Laptop, Front Panel Select: "Windows NT 4.0" <ENTER></p> <p>NOTE: PCS will automatically boot into Windows NT 4.0 after thirty (30) seconds if no user input is provided.</p> <p>Verify the following:</p> <ul style="list-style-type: none"> • "Press Ctrl + Alt + Delete to logon" Dialog box appears 	
5.		<p>EXP Laptop, "Front Panel"</p> <ul style="list-style-type: none"> • Press: <Ctrl> <Alt> <Delete> <p>Verify the following:</p> <ul style="list-style-type: none"> • User Name "Administrator" • "Logon Information" window appears 	
6.		<p>EXP Laptop "Logon Information" window</p> <p>Type: ["password"] *</p> <p>Select: "OK" button</p> <p>Verify the following:</p> <ul style="list-style-type: none"> • "Windows NT" desktop appears <p>* NOTE: Type appropriate password for the rack in use.</p>	
7.		<p>EXP Laptop "Windows NT" desktop</p> <p>Select: "Shortcut to EXPRESS HRF.exe" icon</p> <p>Verify the following:</p> <ul style="list-style-type: none"> • "EXPRESS-HRFMenu" window appears 	
8.		<p>EXP Laptop "EXPRESS-HRF" window</p> <p>Verify the following:</p> <ul style="list-style-type: none"> • Laptop Communications (Comm) "Ethernet" • RIC S/W Mode "Standby" • ORUs "Nominal" • Power Mode "Nominal" 	
9.		<p>EXP Laptop "EXPRESS-HRF" window</p> <p>Select: "ORUs" button</p> <p>Verify the following:</p> <ul style="list-style-type: none"> • "ORUs" window appears 	
10.		<p>EXP Laptop "ORUs" window</p> <p>Verify the following:</p> <ul style="list-style-type: none"> • Solid State Power Controller Module (SSPCM) "Nominal" • Payload Ethernet Hub Bridge (PEHB) "Nominal" • EMU "Nominal" • RIC "Nominal" <p>Select: "OK" button</p>	

TABLE 6.2 EXPRESS LAPTOP ACTIVATION (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
11.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS TCS" button Verify the following: <ul style="list-style-type: none"> "EXPRESS TCS" window appears 	
12.		EXP Laptop "EXPRESS TCS" window Verify the following: <ul style="list-style-type: none"> F1 at least 27 Kg/hr T1 is 17 ± 2 °C and is updating <p>NOTE: Real-time temperature and flow updates can be viewed by placing the mouse cursor over the appropriate button.</p>	
13.		EXP Laptop "EXPRESS TCS" window Select: "X" (close) button * <p>* NOTE: At any time during execution of the EXPRESS software application, windows may be closed by selecting the "X" in the upper right hand corner of the window.</p>	
14.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS Comm" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm" window appears 	
15.		EXP Laptop "EXPRESS Comm" window Select: "P/L Comm" tab Select: "Drawer Comm" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm: Drawer Comm" window appears All appropriate payload locations indicate "unconfigured" 	
16.		EXP Laptop "EXPRESS Comm: Drawer Comm" window Select: "Cancel" button	

T:_____ QA: _____

6.1.3 Health and Status Check

The HRF Rack "Health & Status" consists of 312 Data Words which represent the configuration and status of the HRF Rack internal subsystems and payload drawers. These values are continually updated as the HRF Rack is operating. By viewing the HRF Rack Health & Status, the test conductor can identify the configuration/status of systems such as the RIC, SSPCM, PEHB,

Local Area Network (LAN), Video, and payload drawers. This sequence may be run at any time during a test at the test conductor's discretion.

TABLE 6.3 HEALTH AND STATUS CHECK

Step	PRCU	HRF Rack 1	HRF Rack 2
1.	Health and Status Check Verify the following words display nominal values • 14, 15, 133 - 147		

T:____ QA: _____

TABLE 6.4 EXPRESS HRF HEALTH AND STATUS KEY

1.0									
0	CCSDS V/Type/ APID	CCSDS Sequence Count	CCSDS Packet Length	CCSDS Time: MSB	CCSDS Time: LSB	CCSDS Fine Time	CCSDS Packet ID 1	CCSDS Packet ID 2	7
8	EXPRESS Rack Subset ID	EXPRESS Rack Req ID	EXPRESS Rack Req Data	EXPRESS Rack C&WWord	EXPRESS Reserved Word 1	EXPRESS Reserved Word 2	SSPCM BIT	SSPCM BIT	15
16	SSPCM Discrete Status	SSPCM Discrete Status	SSPCM Discrete Status	SSPCM Discrete Status	SSPCM AnOut 2/1 AFC -2/-1	SSPCM AnOut 4/3 AFC -4/-3	SSPCM AnOut 6/5 AFC -X/-5	SSPCM AnOut 8/7 AFC -X/-7	23
24	SSPCM An Input 0	SSPCM SIR1 An Input 1	SSPCM SIR2 An Input 2	SSPCM An Input 3	SSPCM An Input 4	SSPCM SIR3 An Input 5	SSPCM An Input 6	SSPCM SIR4 An Input 7	31
2.0									
32	SSPCM An Input 8	SSPCM SIR5 An Input 9	SSPCM An Input 10	SSPCM SIR6 An Input 11	SSPCM An Input 12	SSPCM SIR7 An Input 13	SSPCM An Input 14	SSPCM SIR8 An Input 15	39
40	SSPCM FPD An Input 16	SSPCM SIR9 An Input 17	SSPCM SIR10 An Input 18	SSPCM SIR11 An Input 19	SSPCM SIR12 An Input 20	SSPCM SIR13 An Input 21	SSPCM SIR14 An Input 22	SSPCM SIR15 An Input 23	47
48	SSPCM An Input 24	SSPCM An Input 25	SSPCM An Input 26	SSPCM An Input 27	SSPCM FS-7 An Input 28	SSPCM An Input 29	SSPCM An Input 30	SSPCM Fan Speed An Input 31	55
56	SSPCM TS-1 An Input 32	SSPCM TS-2 An Input 33	SSPCM TS-3 An Input 34	SSPCM TS-4 An Input 35	SSPCM TS-5 An Input 39	SSPCM TS-6 An Input 40	SSPCM TS-7 An Input 41	SSPCM TS-8 An Input 42	63
3.0									
64	SSPCM TS-9 An Input 40	SSPCM TS-10 An Input 41	SSPCM FS-1 An Input 42	SSPCM FS-2 An Input 43	SSPCM FS-3 An Input 44	SSPCM TS-11 An Input 45	SSPCM TS-12 An Input 46	SSPCM TS-13 An Input 47	71
72	SSPCM TS-14 An Input 48	SSPCM TS-15 An Input 49	SSPCM TS-16 An Input 50	SSPCM SPARE An Input 51	SSPCM SPARE An Input 52	SSPCM SPARE An Input 53	SSPCM SPARE An Input 54	SSPCM FS-4 An Input 55	79
80	SSPCM SPARE An Input 56	SSPCM SPARE An Input 57	SSPCM Ch 0/Mstr Status	SSPCM Ch 2/1 Status	SSPCM Ch 4/3 Status	SSPCM Ch 6/5 Status	SSPCM Ch 8/7 Status	SSPCM Ch 10/9 Status	87
88	SSPCM Ch 12/11 Status	SSPCM Ch 14/13 Status	SSPCM Ch 16/15 Status	SSPCM Ch 18/17 Status	SSPCM Ch 20/19 Status	SSPCM Ch 22/21 Status	SSPCM Ch 24/23 Status	SSPCM Ch 26/25 Status	95
4.0									
96	SSPCM Ch 28/27 Status	SSPCM Ch Spare/29 Status	SSPCM 120V Input Current	SSPCM Ch 0 DC/DC 120V Out Current	SSPCM Ch 1 DC/DC 120V Out Current	SSPCM Ch 2 RIC 120V Out Current	SSPCM Ch 3 Spare 120V Out Current	SSPCM Ch 4 PEHB 120V Out Current	103
104	SSPCM Ch 5 Spare 120V Out Current	SSPCM Ch 6 FDS 120V Out Current	SSPCM Ch 7 DC/DC 120V Out Current	SSPCM Ch 8 LAP 28V Out Current	SSPCM Ch 9 EMU 28V Out Current	SSPCM Ch 10 Thermal Valve 28V Out Current	SSPCM Ch 11 Thermal Valve 28V Out Current	SSPCM Ch 12 Thermal Valve 28V Out Current	111

TABLE 6.4 EXPRESS HRF HEALTH AND STATUS KEY (CONT'D)

112	SSPCM Ch 13 HRF Fan 28V Out Current	SSPCM Ch 14 SIR1 Cur 28V Out Current	SSPCM Ch 15 SIR2 Cur 28V Out Current	SSPCM Ch 16 SIR3 Cur 28V Out Current	SSPCM Ch 17 SIR4 Cur 28V Out Current	SSPCM Ch 18 SIR5 Cur 28V Out Current	SSPCM Ch 19 SIR6 Cur 28V Out Current	SSPCM Ch 20 SIR7 Cur 28V Out Current	119
120	SSPCM Ch 21 SIR8 Cur 28V Out Current	SSPCM Ch 22 SIR9 Cur 28V Out Current	SSPCM Ch 23 SIR10 Cur 28V Out Current	SSPCM Ch 24 SIR11 Cur 28V Out Current	SSPCM Ch 25 SIR12 Cur 28V Out Current	SSPCM Ch 26 SIR13 Cur 28V Out Current	SSPCM Ch 27 SIR14 Cur 28V Out Current	SSPCM Ch 28 SIR15 Cur 28V Out Current	127
5.0									
128	SSPCM Ch 29 FPDF Cur 28V Out Current	SSPCM Discrete Config Status	SSPCM Discrete Config Status	SSPCM Discrete Config Status	SSPCM Discrete Config Status	Channel 0 (DC/DC) / 1 (DC/DC)	Channel 2 (RIC) / 3 (SPARE)	Channel 4 (PEHB) / 5 (SPARE)	135
136	Channel 6 (FDS) / 7 (SPARE)	Channel 8 (LAP) / 9 (EMU)	Channel 10 (TV-1) / 11 (SV-1)	Channel 12 (SV2) / 13 (HRF Fan)	Channel 14 (SIR1) / 15 (SIR2)	Channel 16 (SIR3) / 17 (SIR4)	Channel 18 (SIR5) / 19 (SIR6)	Channel 20 (SIR7) / 21 (SIR8)	143
144	Channel 22 (SIR9) / 23 (SIR10)	Channel 24 (SIR11) / 25 (SIR12)	Channel 26 (SIR13) / 27 (SIR14)	Channel 28 (SIR15)/29 (FP)	PEHB POST Results	PEHB BIT Results	PEHB EDAC SEU Count	PEHB EDAC SEU Count	151
152	PEHB #1553 EDAC	PEHB #1553 EDAC	PEHB Enet Xmt Err Count	PEHB Enet Xmt Err Count	PEHB Enet Rcv Err Count	PEHB Enet Rcv Err Count	LAN 0 BIT	LAN 0 BIT	159
6.0									
160	LAN 0 BIT	LAN 0 Collision Count	LAN 0 Collision Count	LAN 0 Bridge Fwd Count	LAN 0 Bridge Fwd Count	LAN 0 Bridge Succ Count	LAN 0 Bridge Succ Count	LAN 0 Enet Xmt Err Count	167
168	LAN 0 Enet Xmt Err Count	LAN 0 Enet Rcv Err Count	LAN 0 Enet Rcv Err Count	LAN 0 Port 1 Forwarded	LAN 0 Port 1 Forwarded	LAN 0 Port 2 Forwarded	LAN 0 Port 2 Forwarded	LAN 0 Packet Lim Count	175
176	LAN 0 Packet Lim Count	LAN 0 Port 3 Forwarded	LAN 0 Port 3 Forwarded	LAN 0 Port 4 Forwarded	LAN 0 Port 4 Forwarded	LAN 0 Port 5 Forwarded	LAN 0 Port 5 Forwarded	LAN 0 Port 6 Forwarded	183
184	LAN 0 Port 6 Forwarded	LAN 0 Port 7 Forwarded	LAN 0 Port 7 Forwarded	LAN 0 Port 8 Forwarded	LAN 0 Port 8 Forwarded	LAN 0 Port 9 Forwarded	LAN 0 Port 9 Forwarded	LAN 0 Port 10 Forwarded	191
7.0									
192	LAN 0 Port 10 Forwarded	LAN 0 Port 11 Forwarded	LAN 0 Port 11 Forwarded	LAN 0 Port 12 Forwarded	LAN 0 Port 12 Forwarded	LAN 0 Port 13 Forwarded	LAN 0 Port 13 Forwarded	LAN 0 Port 14 Forwarded	199
200	LAN 0 Port 14 Forwarded	LAN 0 Port 15 Forwarded	LAN 0 Port 15 Forwarded	LAN 0 Port 16 Forwarded	LAN 0 Port 16 Forwarded	LAN 0 Port 17 Forwarded	LAN 0 Port 17 Forwarded	LAN 0 Port 18 Forwarded	207
206	LAN 0 Port 18 Forwarded	LAN 0 Port 19 Forwarded	LAN 0 Port 19 Forwarded	LAN 0 Port 20 Forwarded	LAN 0 Port 20 Forwarded	LAN 1 BIT	LAN 1 BIT	LAN 1 Collision Count	215
216	LAN 1 Collision Count	LAN 1 Bridge Fwd Count	LAN 1 Bridge Fwd Count	LAN 1 Bridge Fwd Count	LAN 1 Bridge Succ Count	LAN 1 Enet Xmt Err Count	LAN 1 Enet Xmt Err Count	LAN 1 Enet Rcv Err Count	223
8.0									
224	LAN 1 Enet Rcv Err Count	LAN 1 Port 1 Forwarded	LAN 1 Port 1 Forwarded	LAN 1 Port 2 Forwarded	LAN 1 Port 2 Forwarded	LAN 1 Packet Lim Count	LAN 1 Packet Lim Count	LAN 2 BIT	231
232	LAN 2 BIT	LAN 2 Collision Count	LAN 2 Collision Count	LAN 2 Bridge Fwd Count	LAN 2 Bridge Fwd Count	LAN 2 Bridge Fwd Count	LAN 2 Bridge Fwd Count	LAN 2 Enet Xmt Err Count	239
240	LAN 2 Enet Xmt Err Count	LAN 2 Enet Rcv Err Count	LAN 2 Enet Rcv Err Count	LAN 2 Port 1 Forwarded	LAN 2 Port 1 Forwarded	LAN 2 Port 2 Forwarded	LAN 2 Port 2 Forwarded	LAN 2 Packet Lim Count	247
248	LAN 2 Packet Lim Count	LAN 2 S1553C BIT	SSPCM Checksum PEHB Checksum	Thermal/ Telemetry/ Stat /1553 Bus Error	Active RS-422 Payloads	HRLC BIT	Active Ethernet Payloads	LAP Video ISS Video	255
9.0									
256	HRO, HB, HRL Rate EMU Util	LAP Eth RIC Int Temp	MCC BIT	Heart Beat	1553 Bus File Xfer Rack Mode	SERC BIT	Ancillary Data Config Chg Counter	PEHB LAN CAM Config Chg Counter	263

TABLE 6.4 EXPRESS HRF HEALTH AND STATUS KEY (CONT'D)

264	ISS LAN Config Chg Counter	Rack Telm Config Chg Counter	PLD Telm Config Chg Counter	Rack Config Chg Counter	PLD Config Chg Counter	Thermal Config Chg Counter	Input Data Lost Status	Input Data Lost Counter	271
272	Output Data Lost Status	Output Data Lost Counter	LRL Packets Sent Count	MRL Packets Sent Count	HRL Packets Sent Count	RIC Reserved 1	RIC Reserved 2	RIC Reserved 3	279
280	RIC Reserved 4	RIC Reserved 5	RIC Reserved 6	RIC Reserved 7	RIC Reserved 8	RIC Reserved 9	RIC Reserved 10	RIC Reserved 11	287
10.0									
288	RIC Reserved 12	RIC Reserved 13	RIC Reserved 14	RIC Reserved 15	RIC Reserved 16	RIC Reserved 17	RIC Reserved 18	RIC Reserved 19	295
296	RIC Reserved 20	RIC Reserved 21	RIC Reserved 22	RIC Reserved 23	RIC Reserved 24	RIC Reserved 25	RIC Reserved 26	RIC Reserved 27	303
304	RIC Reserved 28	RIC Reserved 29	RIC Reserved 30	RIC Reserved 31	RIC Reserved 32	RIC Reserved 33	RIC Reserved 34	RIC Reserved 35	311
312	RIC Reserved 36	RIC Reserved 37	RIC Reserved 38	RIC Reserved 39	RIC Reserved 40	RIC Reserved 41	RIC Reserved 42	RIC Reserved 43	319
11.0									
320	Payload Subset ID	Payload Request ID	Payload Request Data						327

6.2 RACK CONFIGURATION

After the HRF Rack has been activated, its subsystems must be configured for the impending test. The configuration can be accomplished using one (1) of two (2) separate methods: the EXPRESS Laptop or the PRCU. Once the configuration process is complete the status of the HRF Rack and payload configurations may be verified using the EXPRESS Laptop.

6.2.1 Commanding From EXPRESS Laptop

If configuration files have been developed and saved on the EMU, these files can be loaded via the EXPRESS Laptop to configure the HRF Rack for testing. The test conductor may choose to confirm the current HRF Rack configuration as detailed in Section 6.2.4. The "XXXcfg" notation represents the name of the configuration file. Each configuration set consists of .RCF, .PCF, .ANC, .LAN, .PBA, .RTC, .TCT, and .PTT files. The EMU is capable of storing multiple sets of configuration files. Perform EXPRESS LAPTOP RACK CONFIGURATION procedures only if PRCU RACK CONFIGURATION procedures are not utilized.

TABLE 6.5 EXPRESS LAPTOP RIC CONFIGURATION

Step	PRCU	HRF Rack 1	HRF Rack 2
1.		EXP Laptop "EXPRESS-HRF" window Select: "File Mgmt" button Verify the following: • "File Mgmt" window appears	
2.		EXP Laptop "File Mgmt" window "Source" dropdown menu Select: "EMU" NOTE: Wait for DOS ftp window to automatically open and close. "Destination" dropdown menu Select: "RIC"	
3.		EXP Laptop "File Mgmt" window Verify the following: • "EMU Drive" field indicates "Rack EMU Drive" NOTE: If "Rack EMU Drive" is not indicated, then perform the following two (2) steps:	
4.		EXP Laptop "File Mgmt" window Select: "EMU Drive" button Verify the following: • "EMU Drive" window appears	
5.		EXP Laptop "EMU Drive" window Select: "Rack EMU Drive" radio button Select: "Execute" button Window closes automatically	
6.		EXP Laptop "File Mgmt" window <u>EMU Directory:</u> Select: "XXXcfg.RCF" file Verify the following: • "EMU File" field indicates "XXXcfg.RCF"	
7.		EXP Laptop "File Mgmt" window Select: "Copy" button Verify the following: • "EMU File" field is blank	
8.		EXP Laptop "File Mgmt" window <u>EMU Directory:</u> Select: "XXXcfg.PCF" file Verify the following: • "EMU File" field indicates "XXXcfg.PCF"	
9.		EXP Laptop "File Mgmt" window Select: "Copy" button Verify the following: • "EMU File" field is blank	
10.		EXP Laptop "File Mgmt" window <u>EMU Directory:</u> Select: "XXXcfg.ANC" file Verify the following: • "EMU File" field indicates "XXXcfg.ANC"	
11.		EXP Laptop "File Mgmt" window Select: "Copy" button Verify the following: • "EMU File" field is blank	

TABLE 6.5 EXPRESS LAPTOP RIC CONFIGURATION (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
12.		EXP Laptop "File Mgmt" window <u>EMU Directory:</u> Select: "XXXcfg.LAN" file Verify the following: • "EMU File" field indicates "XXXcfg.LAN"	
13.		EXP Laptop "File Mgmt" window Select: "Copy" button Verify the following: • "EMU File" field is blank	
14.		EXP Laptop "File Mgmt" window <u>EMU Directory:</u> Select: "XXXcfg.PBA" file Verify the following: • "EMU File" field indicates "XXXcfg.PBA"	
15.		EXP Laptop "File Mgmt" window Select: "Copy" button Verify the following: • "EMU File" field is blank	
16.		EXP Laptop "File Mgmt" window <u>EMU Directory:</u> Select: "XXXcfg.RTC" file Verify the following: • "EMU File" field indicates "XXXcfg.RTC"	
17.		EXP Laptop "File Mgmt" window Select: "Copy" button Verify the following: • "EMU File" field is blank	
18.		EXP Laptop "File Mgmt" window <u>EMU Directory:</u> Select: "XXXcfg.TCT" file Verify the following: • "EMU File" field indicates "XXXcfg.TCT"	
19.		EXP Laptop "File Mgmt" window Select: "Copy" button Verify the following: • "EMU File" field is blank	
20.		EXP Laptop "File Mgmt" window <u>EMU Directory:</u> Select: "XXXcfg.PTT" file Verify the following: • "EMU File" field indicates "XXXcfg.PTT"	
21.		EXP Laptop "File Mgmt" window Select: "Copy" button Verify the following: • "EMU File" field is blank	
22.		EXP Laptop "File Mgmt" window Select: "X" (close) button	
23.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS TCS" button Verify the following: • "EXPRESS TCS" window appears	

TABLE 6.5 EXPRESS LAPTOP RIC CONFIGURATION (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
24.		EXP Laptop "EXPRESS TCS" window Record the following: <ul style="list-style-type: none"> • F1 (>27 Kg/hr): • T1 (17± 2°C): Verify the following: <ul style="list-style-type: none"> • T1 is updating 	
25.		EXP Laptop "EXPRESS TCS" Window Select: "Flow Control Cases" button In "Desired Flow Rate Cases" field: Select: "Case X" button Select: "Execute" button Verify "Flow rate changes in progress" status appears NOTE: Wait for the "Flow rate changes in progress" message to disappear before proceeding with payload activations. X represents thermal cases A, B, C, D and E.	
26.		EXP Laptop "EXPRESS TCS" window Select: "X" (close) button	
27.		EXP Laptop "EXPRESS-HRF" window Select: "Health & Status" button Verify the following: <ul style="list-style-type: none"> • "Health & Status" window appears • All names for configured payloads are displayed 	
28.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS Comm" button Verify the following: <ul style="list-style-type: none"> • "EXPRESS Comm" window appears 	
29.		EXP Laptop "EXPRESS Comm" window Select: "Rack Control" tab Select: "Rack Telemetry Control" button Verify the following: <ul style="list-style-type: none"> • "EXPRESS Comm: Rack Telemetry Control" window appears 	
30.		EXP Laptop "EXPRESS Comm: Rack Telemetry Control" window Verify the following: <ul style="list-style-type: none"> • Low Rate Link Status is "Inhibited" • Medium (Med) Rate Link Status is "Inhibited" • High Rate Link Status is "Inhibited" • Med Rate Lan Select Status is "Lan 1" 	

TABLE 6.5 EXPRESS LAPTOP RIC CONFIGURATION (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
31.		EXP Laptop "EXPRESS-HRF" window Verify the following: <ul style="list-style-type: none"> • RIC S/W Mode is "Standby" • Power Mode is "Nominal" • No errors appear in message window • ACK field indicates zero (0) 	
32.		EXP Laptop "EXPRESS-HRF" window Select: "RIC S/W Mode" button Verify the following: <ul style="list-style-type: none"> • "RIC S/W Mode" window appears 	
33.		EXP Laptop "RIC S/W Mode" window Select: "Operate" radio button Select: "Execute" button	
34.		EXP Laptop "EXPRESS-HRF" window Verify the following: <ul style="list-style-type: none"> • "RIC S/W Mode" field indicates "Operate" 	
35.		EXP Laptop "EXPRESS Comm: Rack Telemetry Control" window Select: Low Rate Link "Enabled" radio button Select: Medium Rate Link "Enabled" radio button Select: High Rate Link "Enabled" radio button Select: "High Rate: Commanded Rate" dropdown menu Select: "8" Select: "Execute" button	
36.		EXP Laptop "EXPRESS Comm: Rack Telemetry Control" window Verify the following: <ul style="list-style-type: none"> • Low Rate Link Status is "Enabled" • Medium Rate Link Status is "Enabled" • Medium Rate: LAN Select: Status field is "Lan 1" • LAN 1 Ethernet Address: "Actual" field is "00-02-7D-01-02-01" • LAN 2 Ethernet Address: "Actual" field is "00-02-7D-01-02-02" • High Rate Link Status is "Enabled" • High Rate: Actual Rate is "8" Mbps • High Rate: Commanded Rate is "8" Mbps 	
37.		EXP Laptop "EXPRESS Comm: Rack Telemetry Control" window Select: "Cancel" button	

T:____ QA: _____

6.2.2 Commanding From PRCU

The PRCU configures the HRF Rack subsystems such as the RIC, Payload Ethernet Hub Gateway (PEHG), and LANs by sending a series of commands. A final command is sent to place the RIC in "operate" mode. Upon HRF Rack configuration, the payloads can be

commanded to the proper configuration. Perform PRCU RACK CONFIGURATION procedures only if EXPRESS LAPTOP RACK CONFIGURATION procedures are not utilized.

TABLE 6.6 PRCU RIC CONFIGURATION

Step	PRCU	HRF Rack 1	Payload
1.	PRCU wrkstn "C&DH Active Session" window Select: "MDM DATA DEFINITION" button Verify the following: "MDM Data Definition" window appears		
2.	PRCU wrkstn "MDM Data Definition" window Select: PAYLOAD COMMANDS button Verify the following: "Payload Command Table" window appears		
3.	PRCU wrkstn "MDM Data Definition" window Select: "RETURN" button		
4.	PRCU wrkstn "Payload Command Table" window Select: "RIC" Select: "RICRackTLM_CFG" Select: "SEND SELECTED" button Select: "RIC_PEBB_LAN CAM" Select: "SEND SELECTED" button Select: "RIC_ISS_LAN1" Select: "SEND SELECTED" button Select: RICStartLinkAll Select: "SEND SELECTED" button Select: "RICMode_Operate" Select: "SEND SELECTED" Button NOTE: Perform the following step as necessary per the direction of the test conductor.		
5.	PRCU wrkstn "Payload Command Table" window Select: "Fullvalveopen" Select: SEND SELECTED" button		N/A: ____ T: ____ QA: ____

TABLE 6.6 PRCU RIC CONFIGURATION (CONT'D)

Step	PRCU	HRF Rack 1	Payload
6.	<p>PRCU wrkstn "Payload Command Table" window</p> <p>Select: "Payload_X" index</p> <p>Select: "PLDX_Add_PLDCFG"</p> <p>Select: "SEND SELECTED" button</p> <p>Select: "PLDX_CFG_XXXXX"</p> <p>Select: "SEND SELECTED" button</p> <p>NOTE: This step may be repeated for each appropriate drawer location to attain the desired configuration.</p>		
7.		<p>EXP Laptop "EXPRESS-HRF" window</p> <p>Select: "EXPRESS TCS" button</p> <p>Verify the following:</p> <ul style="list-style-type: none"> • "EXPRESS TCS" window appears 	
8.		<p>EXP Laptop "EXPRESS TCS" window</p> <p>Record the following:</p> <ul style="list-style-type: none"> • F1 (<27 Kg/hr): • T1 (17± 2°C): <p>Verify the following:</p> <ul style="list-style-type: none"> • T1 is updating 	
9.		<p>EXP Laptop "EXPRESS TCS" Window</p> <p>Select: "Flow Control Cases" button</p> <p><u>In "Desired Flow Rate Cases" field:</u></p> <p>Select: "Case X" button</p> <p>Select: "Execute" button</p> <p>Verify "Flow rate changes in progress" status appears</p> <p>NOTE: Wait for the "Flow rate changes in progress" message to disappear before proceeding with payload activations. X represents thermal cases A, B, C, D and F.</p>	
10.		<p>EXP Laptop "EXPRESS TCS" window</p> <p>Select: "X" (close) button</p>	
11.		<p>EXP Laptop "EXPRESS-HRF" window</p> <p>Select: "Health & Status" button</p> <p>Verify the following:</p> <ul style="list-style-type: none"> • "Health & Status" window appears • All configured payload names are displayed 	
12.		<p>EXP Laptop "EXPRESS-HRF" window</p> <p>Select: "EXPRESS Comm" button</p> <p>Verify the following:</p> <ul style="list-style-type: none"> • "EXPRESS Comm" window appears 	

TABLE 6.6 PRCU RIC CONFIGURATION (CONT'D)

Step	PRCU	HRF Rack 1	Payload
13.		EXP Laptop "EXPRESS Comm" window Select: "Rack Control" tab Select: "Rack Telemetry Control" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm: Rack Telemetry Control" window appears 	
14.		EXP Laptop "EXPRESS Comm: Rack Telemetry Control" window Select: "High Rate: Commanded Rate" dropdown menu Select: "8" Select: "Execute" button	
15.		EXP Laptop "EXPRESS Comm: Rack Telemetry Control" window Verify the following: <ul style="list-style-type: none"> Low Rate Link Status is "Enabled" Medium Rate Link Status is "Enabled" Medium Rate: LAN Select: Status field is "Lan 1" LAN 1 Ethernet Address: "Actual" field is "00-02-7D-01-02-01" LAN 2 Ethernet Address: "Actual" field is "00-02-7D-01-02-02" High Rate Link Status is "Enabled" High Rate: Actual Rate is "8" Mbps High Rate: Commanded Rate is "8" Mbps 	
16.		EXP Laptop "EXPRESS Comm: Rack Telemetry Control" window Select: "Cancel" button	

T:____ QA: _____

6.2.3 EXPRESS Drawer Activation

Drawer power and communication activation can be initiated through the PRCU or the EXPRESS Laptop. Perform EXPRESS LAPTOP DRAWER ACTIVATION procedures only if PRCU DRAWER ACTIVATION procedures are not utilized.

TABLE 6.7 EXPRESS DRAWER ACTIVATION

Step	PRCU	HRF Rack 1	HRF Rack 2
1.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS Comm" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm" window appears 	
2.		EXP Laptop "EXPRESS Comm" window Select: "P/L Comm" tab Select: "Drawer Comm" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm: Drawer Comm" window appears 	

TABLE 6.7 EXPRESS DRAWER ACTIVATION (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
3.		EXP Laptop "EXPRESS Comm: Drawer Comm" window Select: "Enable" radio buttons for all appropriate configured payloads Select: "Execute" button Select: "Cancel" button	
4.		EXP Laptop "EXPRESS Comm" window Select: "P/L Comm" tab Verify the following: • "Cmd:" field for all appropriate configured payloads indicates "Enabled"	
5.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS EPS" button Verify the following: • "EXPRESS EPS" window appears	
6.		EXP Laptop "EXPRESS EPS" window Select: "P/L Power" tab Select: "Drawer Power" button Verify the following: • "EXPRESS EPS: Drawer Power" window appears	
7.		EXP Laptop "EXPRESS EPS: Drawer Power" window Select: "On" radio buttons for all configured payloads Select: "Execute" button Select: "Cancel" button	
8.		EXP Laptop "EXPRESS EPS" window Select: "P/L Power" tab Verify the following: • All configured payloads display green colored corners.	
9.		EXP Laptop "EXPRESS EPS" window Select: "X" (close) button	

T:____ QA: _____

6.2.4 PRCU Drawer Activation

Drawer power and communication activation can be initiated through the PRCU or the EXPRESS Laptop. Perform EXPRESS LAPTOP DRAWER ACTIVATION procedures only if PRCU DRAWER ACTIVATION procedures are not utilized.

TABLE 6.8 PRCU DRAWER ACTIVATION

Step	PRCU	HRF Rack 1	HRF Rack 2
1.	PRCU wrkstn "C&DH Active Session" window Select: "MDM DATA DEFINITION" button Verify the following: • "MDM Data Definition" window appears		

TABLE 6.8 PRCU DRAWER ACTIVATION (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
2.	PRCU wrkstn "MDM Data Definition" window Select: "PAYLOAD COMMANDS" button Verify the following: • "Payload Command Table" window appears		
3.	PRCU wrkstn "MDM Data Definition" window Select: "RETURN" button		
4.	PRCU wrkstn "Payload Command Table" window Select: "Payload_X" index Select: "PLDX_Comm_ON" Select: "SEND SELECTED" button Select: "PLDX_Power_ON" Select: "SEND SELECTED" button NOTE: This step may be repeated for each configured drawer location (1 – 15) to attain the desired configuration state.		
5.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS Comm" button Verify the following: • "EXPRESS Comm" window appears	
6.		EXP Laptop "EXPRESS Comm" window Select: "P/L Comm" tab Verify the following: • "Cmd:" field for all appropriate payloads indicates "Enabled"	
7.		EXP Laptop "EXPRESS Comm" window Select: "X" (close) button	
8.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS EPS" button Verify the following: • "EXPRESS EPS" window appears	
9.		EXP Laptop "EXPRESS EPS" window Select: "P/L Power" tab Verify the following: • All appropriate payloads display green colored corners.	
10.		EXP Laptop "EXPRESS EPS" window Select: "X" (close) button	

T:_____ QA: _____

6.2.5 EXPRESS Configuration Checks

The configuration of the HRF Rack, each subsystem and payload can be verified using the EXPRESS Laptop. During initial HRF Rack testing, the configuration of the HRF Rack systems and payloads may vary. The test conductor may use this sequence to verify the

current configuration is appropriate for the intended test. The steps in this sequence can be performed in any order or omitted entirely at the discretion of the test conductor.

TABLE 6.9 EXPRESS CONFIGURATION CHECKS

Step	PRCU	HRF Rack 1	HRF Rack 2
1.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS Comm" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm" window appears 	
2.		EXP Laptop "EXPRESS Comm" window Select: "P/L Control" tab Select: "Payload Ancillary Data" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm: Payload Ancillary Data" window appears 	
3.		EXP Laptop "EXPRESS Comm: Payload Ancillary Data" window "Payload(s)" field: Select: "Drawer Location" Data Set(s)/Frame Number(s) fields Verify the following: <ul style="list-style-type: none"> Configuration Status <p>NOTE: This step may be repeated for each of the 15 drawer locations.</p>	
4.		EXP Laptop "EXPRESS Comm: Payload Ancillary Data" window Select: "Cancel" button	
5.		EXP Laptop "EXPRESS Comm" window Select: "Rack Control" tab Select: "Rack LAN CAM Configuration" button Verify the following: <ul style="list-style-type: none"> "Comm: Rack LAN CAM Configuration" window appears 	
6.		EXP laptop "Comm: Rack LAN CAM Configuration" window Select: "LAN" dropdown menu Select: "LAN 0 Hub" Verify the following: <ul style="list-style-type: none"> Configuration Status 	
7.		EXP Laptop "Comm: Rack LAN CAM Configuration" window Select: "LAN" dropdown menu Select: "LAN 1 Hub" Verify the following: <ul style="list-style-type: none"> Configuration Status 	
8.		EXP Laptop "Comm: Rack LAN CAM Configuration" window Select: "LAN" dropdown menu Select: "LAN 2 Hub" Verify the following: <ul style="list-style-type: none"> Configuration Status 	

TABLE 6.9 EXPRESS CONFIGURATION CHECKS (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
9.		EXP Laptop "Comm: Rack LAN CAM Configuration" window Select: "Cancel" button	
10.		EXP Laptop "EXPRESS Comm" window Select: "P/L Control" tab Select: "Payload Configuration" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm: Payload Configuration" window appears 	
11.		EXP Laptop "EXPRESS Comm: Payload Configuration" window "Payloads" field: Select Payload drawer Verify Configuration of the current drawer. NOTE: This step may be repeated for each of the fifteen (15) drawer location.	
12.		EXP Laptop "EXPRESS Comm: Payload Configuration" window Select: "Cancel" button	
13.		EXP Laptop "EXPRESS Comm" window Select: "Rack Control" tab Select: "Rack Configuration" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm: Rack Configuration" window appears 	
14.		EXP Laptop "EXPRESS Comm: Rack Configuration" window Verify the following: <ul style="list-style-type: none"> RIC "Actual Subset ID" Configuration Status 	
15.		EXP Laptop "EXPRESS Comm: Rack Configuration" window Select: "Cancel" button	
16.		EXP Laptop "EXPRESS-HRF" window Select: "Laptop Comm" button Verify the following: <ul style="list-style-type: none"> "Laptop Comm" window appears 	
17.		EXP Laptop "Laptop Comm" window Verify the following: <ul style="list-style-type: none"> "Ethernet" configuration status 	
18.		EXP Laptop "Laptop Comm" window Select: "Cancel" button	
19.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS TCS" button Verify the following: <ul style="list-style-type: none"> "EXPRESS TCS" window appears 	
20.		EXP Laptop "EXPRESS TCS" window Select: "F1" button Verify the following: <ul style="list-style-type: none"> "EXPRESS TCS: F1" window appears 	

TABLE 6.9 EXPRESS CONFIGURATION CHECKS (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
21.		EXP Laptop "EXPRESS TCS: F1" window Verify the following: <ul style="list-style-type: none"> Flow Sensor Limit "Actual" configuration status 	
22.		EXP Laptop "EXPRESS TCS: F1" window Select: "Cancel" button	
23.		EXP Laptop "EXPRESS TCS" window Select: "T6" button Verify the following: <ul style="list-style-type: none"> "EXPRESS TCS: T6" window appears 	
24.		EXP Laptop "EXPRESS TCS: T6" window Verify the following: <ul style="list-style-type: none"> Temperature Sensor Limit "Actual" configuration status 	
25.		EXP Laptop "EXPRESS TCS: T6" window Select: "Cancel" button	
26.		EXP Laptop "EXPRESS TCS" window Select: "X" (close) button	
27.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS Comm" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm" window appears 	
28.		EXP Laptop "EXPRESS Comm" window Select: "Rack Control" tab Select: "Rack Telemetry Configuration" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm: Rack Telemetry Configuration" window appears 	
29.		EXP Laptop "EXPRESS Comm: Rack Telemetry Configuration" window Verify the following: <ul style="list-style-type: none"> Configuration Status 	
30.		EXP Laptop "EXPRESS Comm: Rack Telemetry Configuration" window Select: "Cancel" button	
31.		EXP Laptop "EXPRESS Comm" window Select: "P/L Control" tab Select: "Payload Telemetry" button Select: "ENABLE FUNCTION" button Verify the following: <ul style="list-style-type: none"> "EXPRESS Comm: Payload Telemetry" window appears 	

TABLE 6.9 EXPRESS CONFIGURATION CHECKS (CONT'D)

Step	PRCU	HRF Rack 1	HRF Rack 2
32.		EXPRESS Laptop "EXPRESS Comm: Payload Telemetry" window Perform the following to verify desired payload telemetry configurations: "Payload(s)" field: <ul style="list-style-type: none"> • Select payload • Verify telemetry configuration status 	
33.		EXPRESS Laptop "EXPRESS Comm: Payload Telemetry" window Select: "Cancel" button	

T:_____ QA: _____

6.3 PAYLOAD ACTIVATION

The following sequences assemble and activate the payload drawers after the payload drawer location has been configured through the PRCU or EXPRESS Laptop. Steps are provided to activate the drawer location and the payload. Depending upon the test configuration, assembly of the peripheral hardware may not be necessary. These steps may be performed as directed by the test conductor.

6.3.1 Gas Analyzer System For Metabolic Analysis Of Physiology (GASMAP)

To activate the GASMAP Analyzer, power on the SIR switch. Upon Subrack activation, the payload may be activated. If the "Error" LED remains illuminated during startup, the error must be cleared (per Section 6.3.1.1), and the payload deactivated before attempting another activation.

TABLE 6.10 GASMAP ACTIVATION

Step	PRCU	HRF Rack 1	Payload										
1.			Locate the following hardware: <table><tr><th>Qty</th><th>Item</th></tr><tr><td>1</td><td>GASMAP Analyzer Module</td></tr><tr><td>1</td><td>Catheter</td></tr><tr><td>1</td><td>Flowmeter Cable</td></tr><tr><td>1</td><td>Flow Cartridge</td></tr></table> N/A: _____ T: _____ QA: _____	Qty	Item	1	GASMAP Analyzer Module	1	Catheter	1	Flowmeter Cable	1	Flow Cartridge
Qty	Item												
1	GASMAP Analyzer Module												
1	Catheter												
1	Flowmeter Cable												
1	Flow Cartridge												
2.			Assemble GASMAP hardware N/A: _____ T: _____ QA: _____										
3.			GASMAP Analyzer Module, Front Panel Verify the following: <ul style="list-style-type: none">• “HRF GASMAP MAIN/Auxiliary (AUX)” sw - MAIN“Power Main Source” sw - off										

TABLE 6.10 GASMAP ACTIVATION (CONT'D)

Step	PRCU	HRF Rack 1	Payload
4.		HRF Rack Upper front panel Subrack D2 pwr sw - on Verify the following: • Subrack D2 LED is illuminated green	
5.			GASMAP Analyzer Module, Front Panel • "MAIN/AUX" sw - MAIN • pwr sw - on NOTE: The front panel display may take up to one (1) minute to become active. The GASMAP then goes through a pressure check to determine if the analyzer has maintained vacuum. This process can take anywhere from ten (10) seconds to thirty (30) minutes depending upon the state of the payload. When this process is complete, continue with the rest of the sequence. If the Error LED is illuminated, perform Section 6.3.1.1 in its entirety.
6.			GASMAP Analyzer Module, Front Panel Verify the following appears: • "Main Menu" window • Error LED is not illuminated

T:____ QA: _____

6.3.1.1 Clearing of Errors

The following sequence is to be performed whenever the "ERROR" LED is illuminated on the GASMAP payload. This sequence can be performed during the payload's initial power up procedure or can be executed at any time in Section 6.3.1 when the "ERROR" LED is illuminated. If an "LOV" error exists on the GASMAP error log, this sequence MUST be followed by Analyzer Roughing in Section 6.3.1.2. If an "LOV" error does not exist once the errors are clear, continue with Section 6.3.1.

TABLE 6.11 CLEARING LED ERRORS (GASMAP)

Step	PRCU	HRF Rack 1	Payload
1.			GASMAP Analyzer Module, "Main Menu" Select: "Low Power (Pwr)" <5> Select: "Yes" button <Enter> Verify the following appears: • "Main (Low pwr)" window
2.			GASMAP Analyzer Module, "Main (Low pwr)" window Select: "Diag" <3> Select: "Display" <1> Verify the following appears: • "Dialog Display" window

TABLE 6.11 CLEARING LED ERRORS (GASMAP) (CONT'D)

Step	PRCU	HRF Rack 1	Payload
3.			GASMAP Analyzer Module, "Dialog Display" window Select: "Errors" <4> Verify the following appears: <ul style="list-style-type: none"> • "Display Errors" window
4.			GASMAP Analyzer Module, "Display Errors" window Select: "Error Log" <1> Verify the following appears: <ul style="list-style-type: none"> • "Error Log Info" window
5.			GASMAP Analyzer Module, "Error Log Info" window Verify the following: <ul style="list-style-type: none"> • The number of error entries currently recorded appears Select: <1> For each error entry, perform the following: <ul style="list-style-type: none"> • Log Error in test log Select: Del (=3) <Enter><Enter> Verify the following: <ul style="list-style-type: none"> • All errors have been deleted <p>NOTE: If LED is still illuminated, scroll down to look at the next entry in the file. Repeat this step for all errors entries.</p>
6.			GASMAP Analyzer Module, "Error Log Info" window Select: <MAIN MENU> Verify the following appears: <ul style="list-style-type: none"> • "Main Menu" window <p>NOTE: If the "LOV" error occurred, perform the Section 6.3.1.2</p>

T:_____ QA: _____

6.3.1.2 Analyzer Roughing

This process is to be performed if an "LOV" error occurs during the execution of Section 6.3.1.1. Once the roughing has been completed, the GASMAP unit must be deactivated. This may require the test engineer to repeat the complete GASMAP functional in LS-71139-4, Section 6.3.1.

TABLE 6.12 ANALYZER ROUGHING (GASMAP)

Step	PRCU	HRF Rack 1	Payload
1.			GASMAP Analyzer Module, "Main Menu" window Select: "Roughing"
2.			Connect the following hardware: • Roughing pump to GASMAP Analyzer Module (Roughing Port)
3.			Roughing pump, Main pwr sw - on Following instructions on window Select: <MAIN MENU>

T:_____ QA: _____

6.3.2 Cooling Stowage Drawer

The Cooling Stowage Drawer is activated by switching on the appropriate Subrack switch.

TABLE 6.13 COOLING STOWAGE DRAWER ACTIVATION

Step	PRCU	HRF Rack 1	Payload
1.		HRF Rack Upper front panel • Subrack G1 pwr sw - on • Subrack H2 pwr sw - on Verify the following: • Subrack G1 LED is illuminated green • Subrack H2 LED is illuminated green	
2.			Cooling Stowage (Stwg) Drawer (Dwr) 1, Front Panel Verify the following: Fan audibly engages
3.			Cooling Stwg Dwr 2, Front Panel Verify the following: Fan audibly engages

T:_____ QA: _____

6.3.3 Ultrasound

The Ultrasound can be activated by the following sequence. The Ultrasound executes a nominal power with the powered keyboard attached. If using an HRF Common Monitor, the monitor must be powered through the Workstation. The Workstation Subrack location switch must be "on" and the 28 Vdc power switch "on". In order to view Ultrasound activities on the HRF Common Monitor, the function switch must be placed in the appropriate Ultrasound position.

NOTE: Ultrasound payload is not capable of powering the monitor.

TABLE 6.14 ULTRASOUND ACTIVATION

Step	PRCU	HRF Rack 1	Payload										
1.			Locate the following hardware: Assemble the following hardware per SEG: <table><tr><th>Qty</th><th>Item</th></tr><tr><td>1</td><td>Keyboard Module Assembly (Assy)</td></tr><tr><td>1</td><td>Keyboard Cable Assy</td></tr><tr><td>1</td><td>Monitor Cable Assy</td></tr><tr><td>1</td><td>HRF Monitor</td></tr></table> N/A: _____ T: _____ QA: _____	Qty	Item	1	Keyboard Module Assembly (Assy)	1	Keyboard Cable Assy	1	Monitor Cable Assy	1	HRF Monitor
Qty	Item												
1	Keyboard Module Assembly (Assy)												
1	Keyboard Cable Assy												
1	Monitor Cable Assy												
1	HRF Monitor												
2.			Assemble hardware per SEG46114600 N/A: _____ T: _____ QA: _____										
3.			Ultrasound Unit Assy, Front Panel Verify the following: <ul style="list-style-type: none">• Main pwr sw - off• LED is not illuminated										
4.			Keyboard Module Assy, Left Side Panel <ul style="list-style-type: none">• “Keyboard Power” sw - STBY										
5.		HRF Rack Upper Front panel <ul style="list-style-type: none">• Subrack C1 pwr sw - on• Subrack D1 pwr sw - on• Subrack G2 pwr sw - on Verify the following: <ul style="list-style-type: none">• Subrack C1 LED is illuminated green• Subrack D1 LED is illuminated green• Subrack G2 LED is illuminated green											
6.			HRF Workstation, Front Panel 28 Vdc pwr sw - on										
7.			HRF Monitor, Right Side Panel Function sw - US LIVE “SYSTEM POWER” sw - on										
8.			HRF Monitor, Front Panel “Panel pwr” button - on										
9.			Ultrasound Unit Assy, Front Panel “Ultrasound Power” sw - on NOTE: Wait fifteen (15) seconds before proceeding.										
10.			Keyboard Module Assy, Left Side Panel “Standby Power” sw - on										
11.			Ultrasound Unit Assy, Front Panel Verify the following: <ul style="list-style-type: none">• Ultrasound Power LED is illuminated										
12.			HRF Monitor, front panel Verify the following appears: <ul style="list-style-type: none">• Sonogram Screen• Operational Clock NOTE: If warning or error banners appear, record them in the error log by pressing the <Superkey><THI<0> twice before proceeding with the following step.										

T: _____ QA: _____

6.3.4 Workstation

TABLE 6.15 WORKSTATION ACTIVATION

Step	PRCU	HRF Rack 1	Payload														
1.			Locate the following hardware: <table><tr><th>Qty</th><th>Item</th></tr><tr><td>1</td><td>HRF Workstation keyboard</td></tr><tr><td>1</td><td>HRF Monitor</td></tr><tr><td>1</td><td>Workstation (wrkstn) Monitor cable</td></tr><tr><td>1</td><td>Mouse, serial</td></tr><tr><td>1</td><td>wrkstn Keyboard/Mouse cable</td></tr><tr><td>1</td><td>Serial cable</td></tr></table> N/A: _____ T: _____ QA: _____	Qty	Item	1	HRF Workstation keyboard	1	HRF Monitor	1	Workstation (wrkstn) Monitor cable	1	Mouse, serial	1	wrkstn Keyboard/Mouse cable	1	Serial cable
Qty	Item																
1	HRF Workstation keyboard																
1	HRF Monitor																
1	Workstation (wrkstn) Monitor cable																
1	Mouse, serial																
1	wrkstn Keyboard/Mouse cable																
1	Serial cable																
2.			Assemble the Workstation hardware N/A: _____ T: _____ QA: _____														
3.			HRF Workstation, Front Panel Verify the following: • "Main Power" sw - off • Power LED is not illuminated														
4.			HRF Monitor, Front Panel Verify the following: • Main pwr sw - off • Power LED is not illuminated														
5.		HRF Rack Upper Front panel • Subrack G2 pwr sw - on Verify the following: • Subrack G2 LED is illuminated green															
6.			HRF Workstation, Front Panel • 28 Vdc pwr sw - on • "Main Power" sw - on Verify the following: • Main Power LED - on														
7.			HRF Monitor, Right Side Panel Function sw - WORK STATION "SYSTEM POWER" sw - on														
8.			HRF Monitor, Front Panel "Panel pwr" button - on														
9.			HRF Monitor, Front Panel Select: "Windows NT 4.0" <ENTER> NOTE: Workstation will automatically boot into Windows NT 4.0 after thirty (30) seconds if no user input is provided. Verify the following appears: • "Press Ctrl + Alt + Delete to log on" Dialog box														
10.			HRF Workstation, "Press Ctrl + Alt +..." Dialog box Select: <Ctrl><Alt><Delete> Verify the following appears: • "Logon Information" window NOTE: The following step will not be performed when executing a workstation functional sequence.														

TABLE 6.15 WORKSTATION ACTIVATION (CONT'D)

Step	PRCU	HRF Rack 1	Payload
11.			HRF Monitor, "Logon Information" window At "user" prompt: Type: hrf At "password" prompt: Type: hrf Select: <Enter> Verify the following appears: • "Windows" desktop

T:_____ QA: _____

6.4 PAYLOAD DEACTIVATION

The following procedures may be performed sequentially or in parallel of preparation for HRF Rack deactivation.

6.4.1 GASMAP

TABLE 6.16 GASMAP DEACTIVATION

Step	PRCU	HRF Rack 1	Payload										
1.			GASMAP Analyzer Module, Keypad Select: <Main Menu> Select: “Standby” <1> <u>At prompt:</u> Select: “Yes” <Enter> Verify the following: • Main Menu “standby” appears										
2.			GASMAP Analyzer Module, Front Panel Pwr sw - off Verify the following: • Power LED is not illuminated										
3.		HRF Rack Upper front panel • Subrack D2 pwr sw - off Verify the following: • Subrack D2 LED is not illuminated											
4.			If necessary, disassemble the following hardware: <table><thead><tr><th>Qty</th><th>Item</th></tr></thead><tbody><tr><td>1</td><td>GASMAP Analyzer Module</td></tr><tr><td></td><td>Catheter</td></tr><tr><td></td><td>Flowmeter Cable</td></tr><tr><td>1</td><td>Flow Cartridge</td></tr></tbody></table>	Qty	Item	1	GASMAP Analyzer Module		Catheter		Flowmeter Cable	1	Flow Cartridge
Qty	Item												
1	GASMAP Analyzer Module												
	Catheter												
	Flowmeter Cable												
1	Flow Cartridge												

T:_____ QA: _____

6.4.2 Cooling Stowage Drawer

TABLE 6.17 COOLING STOWAGE DRAWER DEACTIVATION

Step	PRCU	HRF Rack 1	Payload
1.		HRF Rack Upper front panel • Subrack G1 pwr sw - off • Subrack H2 pwr sw - off Verify the following: • Subrack G1 LED is not illuminated • Subrack H2 LED is not illuminated	

T:_____ QA: _____

6.4.3 Ultrasound

TABLE 6.18 ULTRASOUND DEACTIVATION

Step	PRCU	HRF Rack 1	Payload										
1.			Keyboard Module Assy, Left Side Panel "Keyboard Power" sw - STBY										
2.			Ultrasound Unit Assy, Front Panel • Main pwr sw - off Verify the following: • Pwr LED is not illuminated										
3.			HRF Monitor, Front Panel "Panel pwr" button - off										
4.			HRF Monitor, Right side Panel "SYSTEM POWER" sw - off										
5.			HRF wrkstn, Front Panel "28Vdc pwr" sw - off										
6.		HRF Rack Upper Front panel • Subrack C1 pwr sw - off • Subrack D1 pwr sw - off • Subrack G2 pwr sw - off Verify the following: • Subrack C1 LED is not illuminated • Subrack D1 LED is not illuminated • Subrack G2 LED is not illuminated											
7.			If necessary, disassemble the following hardware: <table><tr><th>Qty</th><th>Item</th></tr><tr><td>1</td><td>Keyboard Module Assy</td></tr><tr><td>1</td><td>Keyboard Cable Assy</td></tr><tr><td>1</td><td>Monitor Cable Assy</td></tr><tr><td>1</td><td>HRF Monitor</td></tr></table>	Qty	Item	1	Keyboard Module Assy	1	Keyboard Cable Assy	1	Monitor Cable Assy	1	HRF Monitor
Qty	Item												
1	Keyboard Module Assy												
1	Keyboard Cable Assy												
1	Monitor Cable Assy												
1	HRF Monitor												

T:_____ QA: _____

6.4.4 Workstation

TABLE 6.19 WORKSTATION DEACTIVATION

Step	PRCU	HRF Rack 1	Payload														
1.			HRF Monitor, Right Side Panel Function sw - WORK STATION														
2.			HRF Monitor, Front Panel Close all active sessions														
3.			EXP Laptop "Windows NT" desktop Select: "Start" button Select: "Shutdown" Verify the following: • "Shutdown" window appears														
4.			HRF Monitor "Shutdown" window Select: "Shutdown the Computer?" radio button Select: "Yes" button														
5.			HRF Monitor "Windows NT" desktop Verify the following: • "It is now safe to turn off your computer" window appears														
6.			HRF Monitor, Front Panel "Panel pwr" button - off														
7.			HRF Monitor, Right Side Panel "SYSTEM POWER" sw - off Verify the following: • Power LED is not illuminated														
8.			HRF Workstation, Front Panel "Main Power" sw - off 28 Vdc pwr sw - off Verify the following: • Power LED is not illuminated														
9.		HRF Rack Upper Front panel • Subrack G2 pwr sw - off Verify the following: • Subrack G2 LED is not illuminated															
10.			If necessary, disassemble the following hardware: <table><tr><th>Qty</th><th>Item</th></tr><tr><td>1</td><td>HRF Workstation keyboard</td></tr><tr><td>1</td><td>HRF Monitor</td></tr><tr><td>1</td><td>Workstation Monitor cable</td></tr><tr><td>1</td><td>Mouse, serial</td></tr><tr><td>1</td><td>WS Keyboard/Mouse cable</td></tr><tr><td>1</td><td>Serial cable</td></tr></table>	Qty	Item	1	HRF Workstation keyboard	1	HRF Monitor	1	Workstation Monitor cable	1	Mouse, serial	1	WS Keyboard/Mouse cable	1	Serial cable
Qty	Item																
1	HRF Workstation keyboard																
1	HRF Monitor																
1	Workstation Monitor cable																
1	Mouse, serial																
1	WS Keyboard/Mouse cable																
1	Serial cable																

T:_____ QA: _____

6.5 RACK DECONFIGURATION

To reconfigure a payload drawer, the payload must be deactivated and communication and power for the drawer location must be deactivated. Deactivation of communication and power for a drawer location can be accomplished using one (1) of two (2) different methods: the EXPRESS Laptop, or the PRCU. Once the payload is off and communication and power are deactivated, commands are

sent to the HRF Rack to deconfigure the specific location. After the location is deconfigured, commands can be sent to establish a new configuration. Power and communication must be re-enabled before activating the payload.

6.5.1 EXPRESS Laptop Deconfiguration of RIC

Upon payload deactivation, the EXPRESS Laptop can be used to deconfigure the HRF Rack by sending a series of commands to turn off power and inhibit communication for specific drawer locations. After communication and power are disabled, commands can be sent to change the RIC Mode to the “Standby” and delete or modify drawer configurations.

TABLE 6.20 EXPRESS LAPTOP RIC DECONFIGURATION

Step	PRCU	HRF Rack 1	Payload
1.		EXP Laptop “EXPRESS-HRF” window Select: “EXPRESS EPS” button Verify the following: • “EXPRESS EPS” window appears	
2.		EXP Laptop “EXPRESS EPS” window Select: “P/L Power” tab Select: “Drawer Power” button Verify the following: • “EXPRESS EPS: Drawer Power” window appears	
3.		EXP Laptop “EXPRESS EPS: Drawer Power” window Select: “Off” radio buttons for all appropriate payloads Select: “Execute” button Select: “Cancel” button	
4.		EXP Laptop “EXPRESS EPS” window Select: “P/L Power” tab Verify the following: • All appropriate payloads display black colored corners	
5.		EXP Laptop “EXPRESS EPS” window Select: “X” (close) button	
6.		EXP Laptop “EXPRESS-HRF” window Select: “EXPRESS Comm” button Verify the following: • “EXPRESS Comm” window appears	
7.		EXP Laptop “EXPRESS Comm” window Select: “P/L Comm” tab Select: “Drawer Comm” button Verify the following: • “EXPRESS Comm: Drawer Comm” window appears	

TABLE 6.20 EXPRESS LAPTOP RIC DECONFIGURATION (CONT'D)

Step	PRCU	HRF Rack 1	Payload
8.		EXP Laptop "EXPRESS Comm: Drawer Comm" window Select: "Inhibit" radio buttons for all appropriate payloads Select: "Execute" button Select: "Cancel" button	
9.		EXP Laptop "EXPRESS Comm" window Select: "P/L Comm" tab Verify the following: • "Cmd:" field for all appropriate payloads indicates "Inhibited"	
10.		EXP Laptop "EXPRESS Comm: Payload Configuration" window "Payloads" of field: Select: payload Select: "Delete" button Select: "Yes" button to confirm Select: "Cancel" button NOTE: This step may be repeated as necessary to delete desired payload configurations.	
11.		EXP Laptop "EXPRESS Comm" window Select: "P/L Comm" tab Select: "Drawer Comm" button Verify the following: • "EXPRESS Comm: Drawer Comm" window appears • All appropriate drawer locations indicate "unconfigured"	
12.		EXP Laptop "EXPRESS Comm: Drawer Comm" window Select: "Cancel" button	
13.		EXP Laptop "EXPRESS Comm" window Select: "X" (close) button	
14.		EXP Laptop "EXPRESS Comm" window Select: "P/L Control" tab Select: "Payload Configuration" button Verify the following: • "EXPRESS Comm: Payload Configuration" window appears	

T:_____ QA: _____

6.5.2 PRCU Remote Deconfiguration of RIC

Upon payload deactivation, the PRCU can be used to deconfigure the HRF Rack by sending a series of commands to turn off power and inhibit communication for specific drawer locations. After communication and power are disabled, commands can be sent to change the RIC Mode to "Standby" and delete or modify drawer configurations.

TABLE 6.21 PRCU RIC DECONFIGURATION

Step	PRCU	HRF Rack 1	Payload
1.	PRCU wrkstn "C&DH Active Session" window Select: "MDM Data Definition" Verify the following: • "MDM Data Definition" window appears		
2.	PRCU wrkstn "MDM Data Definition" window Select: "Payload Commands" button Verify the following: • "Payload Command Table" window appears		
3.	PRCU wrkstn "MDM Data Definition" window Select: "RETURN" button		
4.	PRCU wrkstn "Payload Command Table" window Select: "Payload_X" index Select: "PLDX_Comm_OFF" Select: "SEND SELECTED" button Select: "PLDX_Power_OFF" Select: "SEND SELECTED" button NOTE: This step may be repeated as necessary to deactivate desired drawer locations.		
5.	PRCU wrkstn "Payload Command Table" window Select: "RIC" index Select: "RICMode_Standby" Select: "SEND SELECTED" button		
6.		EXP Laptop "EXPRESS-HRF" window Verify the following: • "RIC S/W Mode" field indicates "Standby"	
7.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS Comm" button Verify the following: • "EXPRESS Comm" window appears	
8.		EXP Laptop "EXPRESS-HRF" window Select: "EXPRESS EPS" button Verify the following: • "EXPRESS EPS" window appears	
9.		EXP Laptop "EXPRESS EPS" window Select: "P/L POWER" tab Verify the following: • All appropriate payloads display black colored corners	
10.		EXP Laptop "EXPRESS EPS" window Select: "X" (close) button	

TABLE 6.21 PRCU RIC DECONFIGURATION (CONT'D)

Step	PRCU	HRF Rack 1	Payload
11.		EXP Laptop "EXPRESS Comm" window Select: "P/L Comm" tab Verify the following: • "Cmd:" field for all appropriate payloads indicate "Inhibited"	
12.		EXP Laptop "EXPRESS Comm" window Select: "P/L Control" tab Select: "Payload Configuration" button Verify the following: • "EXPRESS Comm: Payload Configuration" window appears	
13.		EXP Laptop "EXPRESS Comm: Payload Configuration" window "Payloads" field: Select: payload Select: "Delete" button Select: "Yes" button to confirm NOTE: The "Select:'s" above may be repeated as necessary to delete desired payload configurations. Select: "Cancel" button	
14.		EXP Laptop "EXPRESS Comm" window Select: "P/L Comm" tab Select: "Drawer Comm" button Verify the following: • "EXPRESS Comm: Drawer Comm" window appears • All appropriate payload locations indicate "unconfigured"	
15.		EXP Laptop "EXPRESS Comm: Drawer Comm" window Select: "Cancel" button	
16.		EXP Laptop "EXPRESS Comm" window Select: "X" (close) button	

6.6 EXPRESS LAPTOP DEACTIVATION

The EXPRESS Laptop is deactivated prior to removing power from the HRF Rack.

TABLE 6.22 LAPTOP DEACTIVATION

Step	PRCU	HRF Rack 1	Payload
1.		EXP Laptop "EXPRESS-HRF" window Select: "Exit" button Verify the following: • "Exit Dialog" window appears	
2.		EXP Laptop "Exit Dialog" window Select: "Yes" button Verify the following: • HRF Rack Application closes	

TABLE 6.22 LAPTOP DEACTIVATION (CONT'D)

Step	PRCU	HRF Rack 1	Payload
3.		EXP Laptop "Windows NT" desktop Select: "Start" button Select: "Shutdown" Verify the following: • "Shutdown" window appears	
4.		EXP Laptop "Shutdown" window Select: "Shutdown the Computer?" radio button Select: "Yes" button	
5.		EXP Laptop "Windows NT" desktop Verify the following: • "It is now safe to turn off your computer" window appears	
6.		EXP Laptop left side panel • Main pwr sw - off	
7.		PCS PWR Supply • "SW1" Switch (sw) - off Verify LED is not illuminated	
8.			IFPR upper front panel • Laptop pwr sw - off Verify LED is not illuminated

T: _____ QA: _____

6.7 EMERGENCY POWER DOWN

Use the following sequence to power down the HRF Rack in an emergency.

TABLE 6.23 EMERGENCY POWER DOWN

Step	PRCU	HRF Rack 1	Payload
1.	Programmable Electrical Power System Emulator (PEPSE) lower front panel Depress: "EMERGENCY STOP" button NOTE: Another "EMERGENCY STOP" button is located on the Northwest wall in JSC Building 241 Room 100H between the two (2) exits.		
2.		Thermal Return valve - Closed/ Disconnected Thermal Supply valve - Closed/ Disconnected	N/A: _____ T: _____ QA: _____
3.		Perform EXPRESS Laptop Deactivation	
4.	Moderate (MOD) Chiller right side panel Recirculating Flow Control (RFC) valve - Closed		
5.	MOD Chiller front panel • Main pwr sw - off		
6.			Perform Ultrasound Deactivation
7.			Perform Workstation Deactivation
8.			Perform GASMAP Deactivation

TABLE 6.23 EMERGENCY POWER DOWN (CONT'D)

Step	PRCU	HRF Rack 1	Payload
9.			Perform Cooling Stowage Drawer Deactivation
10.	Perform PRCU Deactivation per LS-71139-2 Section 6.0		

T:_____ QA: _____

6.8 RACK MAINTENANCE OPERATIONS

6.8.1 Mixing Fan Activation

TABLE 6.24 MIXING FAN ACTIVATION

Step	PRCU	HRF Rack 1	HRF Rack 2
1.		EXP Laptop "Expedite the Processing of Experiments for Space Station (EXPRESS) – HRF" window Select: "EXPRESS EPS" button Verify the following: "EXPRESS EPS" window appears	
2.		EXP Laptop "EXPRESS EPS" window Select: "SSPCM Control" tab Select: "SSPCM Actual Condition" button Select: "Channel 13 Spare" Mouse: Left <click>	
3.		EXP Laptop "Output State" Field Commanded State Select: Output State "On" radio button Select: "Execute" button Verify the following: Mixing Fan Activates Select: "Cancel" button	
4.		EXP "EXPRESS EPS" window Select: "Rack Power Status" tab Verify "Channel 13 Spare" Power Status	
6.		EXP Laptop "EXPRESS EPS" window Select: "X" (close) button	

6.8.2 Mixing Fan Deactivation

TABLE 6.25 MIXING FAN DEACTIVATION

Step	PRCU	HRF Rack 1	HRF Rack 2
1.		EXP Laptop "EXPRESS EPS" window Channel 13 Spare EXP Laptop "Output State" Commanded State Select: Output State "Off" radio button Select: "Execute" button Verify the following: Mixing Fan Deactivates Select: "Cancel" button	
2.		EXP Laptop "EXPRESS EPS" window Select: "X" (close) button	

6.8.3 Create/Save RIC Configuration Files

The following sequence maybe utilized to create specific rack configurations. After the rack has been configured to the appropriate settings the configuration maybe saved on to the RIC. The RIC stores this configuration using a set of 8 files. Once the set of files is loaded on the RIC the rack maybe configured by transferring the files to the EMU during activation of the Laptop.

TABLE 6.26 CREATE/SAVE RIC CONFIGURATION FILES

Step	PRCU	HRF Rack I	HRF Rack II
1.	Establish Rack Payload Configuration from PRCU Section 6.2.2. NOTE: Modifications maybe made using EXPRESS Laptop.		
2.		EXP Laptop "EXPRESS HRF" window Select: "File Mgmt" button Verify the following: • "File Mgmt" window appears	
3.		EXP Laptop "File Mgmt" window Verify the following: • "EMU Drive" field indicates "Rack EMU Drive" NOTE: If "Rack EMU Drive" is not indicated, then perform the following two (2) steps:	
4.		EXP Laptop "File Mgmt" window Select: "EMU Drive" button Verify the following: • "EMU Drive" window appears	N/A: ____ T: ____ QA: ____
5.		EXP Laptop "EMU Drive" window Select: "Rack EMU Drive" radio button Select: "Execute" button Window closes automatically	N/A: ____ T: ____ QA: ____

TABLE 6.26 CREATE/SAVE RIC CONFIGURATION FILES (CONT'D)

Step	PRCU	HRF Rack I	HRF Rack II
6.		<p>EXP Laptop "File Mgmt" window Select: "Source" dropdown menu Select: EMU</p> <p>NOTE: Wait for DOS ftp window to open and close.</p>	
7.		<p>EXP Laptop "File Mgmt" window Select: "Destination" dropdown menu Select: Laptop Select: "Laptop Destination" dropdown menu Navigate to: "C:\TEMP" directory</p>	
8.		<p>EXP Laptop "File Mgmt" window Select: "EMU Directory" dropdown menu Select: CFG Verify the following: • CFG files list appears</p>	
9.		<p>EXP Laptop, "CFG Files" list Select: "Checkpt.XXX" File Select: "Copy" button</p> <p>NOTE: DOS ftp window opens & closes for each file copy. This process maybe performed for each of the eight (8) Checkpt.XXX Files in the CFG directory.</p> <p>Verify the following: All appropriate "Checkpt.XXX" files appear in the Laptop C:\TEMP destination directory.</p>	
10.		<p>EXP Laptop "Windows NT" desktop Select: "Start" menu <Right Click> Select: "Windows NT Explorer" Verify the following: • "Exploring" window opens</p>	
11.		<p>EXP Laptop "Exploring" window Navigate to: "C:\TEMP" directory Rename each Checkpt.XXX file</p> <p>NOTE: File nomenclature must not exceed five (5) characters, and should be formatted accordingly. "NAMEcfg.XXX" (Do not modify the File extension.) Hold down shift key, type Filename using upper case characters. Upon entry completion, Filename will revert to a lowercase character format. When viewed in the EMU Directory, the Filename will appear in the correct uppercase character format.</p> <p>Select: "X" (close) button</p>	
12.		<p>EXP Laptop "File Mgmt" window Select: "Source" dropdown menu Select: "Laptop" Navigate to "C:\TEMP" directory</p>	

TABLE 6.26 CREATE/SAVE RIC CONFIGURATION FILES (CONT'D)

Step	PRCU	HRF Rack I	HRF Rack II
13.		<p>EXP Laptop "File Mgmt" window Select: "Destination" dropdown menu Select: "EMU"</p> <p>NOTE: Wait for DOS ftp window to open and close.</p>	
14.		<p>EXP Laptop "File Mgmt" window Select: "EMU Directory" dropdown menu Select: "CFG" Select: "NAMEcfg.RCF" Select: "Copy" button</p> <p>NOTE: DOS ftp window opens and closes two (2) times for each file copied. Repeat this step for the following file extensions: .PCF, .ANC, .LAN, .PBA, .RTC, .TCT, .PTT.</p>	
15.		<p>EXP Laptop "File Mgmt" window EMU Directory: CFG Verify the files transferred above appear.</p> <p>NOTE: If files do not appear in the EMU Directory close the EXPRESS application and re-launch the executable file.</p>	
16.		<p>EXP Laptop "File Mgmt" window Select: "X" (close) button</p>	

APPENDIX A

Forms

For reference purposes only.

1. JPIC		Discrepancy Report/Material Review Record NASA - Lyndon B. Johnson Space Center			2. Page 1 of ____	
3. Ref. Doc. #		4. INR #		5. DR #		
6. Name of Top Assy.		7. Drawing or P/N		8. S/N or Lot #		
10. Name of Sub Assy		11. Drawing or P/N		12. S/N or Lot #		
14. Name of Component		15. Drawing or P/N		16. S/N or Lot #		
18. Description of nonconformance						
19. Initiator's name (print and sign)		20. Title/Stamp No.		21. Org.		
				22. Location		
				23. Date		
24. Responsible Engineer/Mail Code		25. CHRP Code		26. CAGE Code		
				27. Time/cycles used		
xx. Category		29. PRACA Reportable		30. Configuration Change?		
<input type="checkbox"/> Critical		<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No		
<input type="checkbox"/> Major				<input type="checkbox"/> Yes <input type="checkbox"/> No		
<input type="checkbox"/> Minor		FIAR # _____		DCN # _____		
				Waiver # _____		
				CAS # _____		
33. Final Disposition		34. MRR Req'd?		35. Final Acceptance Stamp and		
<input type="checkbox"/> Rework		<input type="checkbox"/> Yes		[Stamp Area]		
<input type="checkbox"/> Repair		<input type="checkbox"/> No				
<input type="checkbox"/> Change Classification		<input type="checkbox"/> Scrap				
<input type="checkbox"/> Use-as-is		<input type="checkbox"/> Return to vendor/supplier				
		<input type="checkbox"/> Written in error				
Material Review Board <small>(signatures must be typed or printed and stamped)</small>						
36. Stress Engineer		Date		37. Materials Engineer		
				Date		
38. Project Engineer		Date		39. Quality Engineer		
				Date		
40. Other (print or type title)		Date		41. QA Rep. (NASA)		
				Date		
T1 Resp. Org.		T2 HW Type		T3 Prev. Cond.		
T4 Fail. Mode		T5 Defect		T6 Remedial Act.		
T7 Cause		T8 Recur. Ctrl.		T9 Pert. Org.		
T10 Proc. Flow						
JSC Form 2176 (Rev August 10, 1999) (MS Word Sep 97)						

Figure A-3 Discrepancy Report/Material Review Record

1. IDR #	Discrepancy Report/Material Review Record	3. Page ____ of ____
2. DR #	NASA - Lyndon B. Johnson Space Center	
Continuation Sheet		
4. Insp. Pts.	5. Seq. No.	<div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> 6. Instructions <i>(Print, type, or write legibly)</i> </div> <div style="width: 35%;"> 7. Verification Stamps <div style="display: flex; justify-content: space-between; font-size: small;"> <div>Tech.</div> <div>Qual.</div> </div> </div> </div>
8. Final Acceptance Stamp and Date		
JSC Form 2176A (Sep 97) (MS Word Sep 97)		

Figure A-4 Discrepancy Report/Material Review Record Continuation Sheet

1. DR #	Discrepancy Report/Material Review Record NASA - Lyndon B. Johnson Space Center		2. Page ____ of ____
Summary Sheet			
3. Configuration Change? <input type="checkbox"/> No <input type="checkbox"/> Yes DCN #		4. CCBD #	5. PRACA #
6. Remedial Action			
7. Root Cause			
8. Corrective Action (Recurrence Control)			
MRB APPROVAL			
9. Stress Engineer (Print and sign)		10. Materials Engineer (Print and sign)	Date
11. Project Engineer (Print and sign)		12. Quality Engineer (Print and sign)	Date
13. Other (Print and sign)		14. QA Rep. (NASA) (Print and sign)	Date
JSC Form 2176B (Oct 97) (MS Word Sep 97)			

Figure A-5 Discrepancy Report/Material Review Record Summary Sheet

1. DR #	Discrepancy Report/Material Review Record NASA - Lyndon B. Johnson Space Center	2. Page ____ of ____							
Multiple Disposition Coding Sheet									
A.									
T1 Resp. Org.	T2 HW Type	T3 Prev. Cond.	T4 Fail. Mode	T5 Defect	T6 Remedial Act.	T7 Cause	T8 Recuf. Cntrl.	T9 Perf. Org.	T10 Proc. Flow
B.									
T1 Resp. Org.	T2 HW Type	T3 Prev. Cond.	T4 Fail. Mode	T5 Defect	T6 Remedial Act.	T7 Cause	T8 Recuf. Cntrl.	T9 Perf. Org.	T10 Proc. Flow
C.									
T1 Resp. Org.	T2 HW Type	T3 Prev. Cond.	T4 Fail. Mode	T5 Defect	T6 Remedial Act.	T7 Cause	T8 Recuf. Cntrl.	T9 Perf. Org.	T10 Proc. Flow
D.									
T1 Resp. Org.	T2 HW Type	T3 Prev. Cond.	T4 Fail. Mode	T5 Defect	T6 Remedial Act.	T7 Cause	T8 Recuf. Cntrl.	T9 Perf. Org.	T10 Proc. Flow
E.									
T1 Resp. Org.	T2 HW Type	T3 Prev. Cond.	T4 Fail. Mode	T5 Defect	T6 Remedial Act.	T7 Cause	T8 Recuf. Cntrl.	T9 Perf. Org.	T10 Proc. Flow
F.									
T1 Resp. Org.	T2 HW Type	T3 Prev. Cond.	T4 Fail. Mode	T5 Defect	T6 Remedial Act.	T7 Cause	T8 Recuf. Cntrl.	T9 Perf. Org.	T10 Proc. Flow
3. Quality Engineer (Print and Sign)						Date			
JSC Form 2176C (Oct 97) (MS Word Oct 97)									

Figure A-6 Discrepancy Report/Material Review Record Multiple Disposition Coding Sheet



FLASH REPORT

For Safety and Product Assurance use only

NASA mishap no.	
OSHA file no.	
GENERAL INFORMATION	
1. Date (MM/DD/YY)	2. Time <input type="checkbox"/> a.m. or <input type="checkbox"/> p.m.
3. Building number/location	4. Specific area
5. Category of incident (check appropriate box)	
<input type="checkbox"/> Injury/accident <input type="checkbox"/> Fire <input type="checkbox"/> Auto accident <input type="checkbox"/> Explosion <input type="checkbox"/> Chemical spill <input type="checkbox"/> Other	
6. Description of incident (explain what happened, including cause or description of failure)	
7. SEAT involvement (name of organization)	
PERSONNEL INVOLVED	
8. Name (last, first, middle initial)	9. Telephone
CONTACT PERSON	
10. Name (last, first, middle initial)	11. Telephone

FORM SEAT 004 (09/23/97)

Figure A-7 Flash Report

[illegible]

Figure A-9 Repetitive Operations Log

Deviation						Page ____ of ____
TPS Number:			Document Number:		Project Manager:	Test Engineer:
Dev No	Section	Step	Type (P/T)	Change		Reason
Originator:			Phone:		Date:	Quality Engineer:

Figure A-10 Deviation Sheet

Deviation Continuation Page				TPS Number:	Document Number:	Page ____ of ____
Dev No	Section	Step	Type (P/T)	Change	Reason	

Figure A-11 Deviation Continuation Sheet

APPENDIX B

Illustrations

N/A

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